# Exhibit 6

	Page 1
1	UNITED STATES DISTRICT COURT
	EASTERN DISTRICT OF MICHIGAN
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4	JASON COUNTS, DONALD KLEIN, C.A. NO.
	OSCAR ZANORA, DEREK LONG, 1:16-CV-12541-TLL-PTM
5	HASSAM HIRMIZ, JASON SILVEUS,
	JOHN MISKELLY, THOMAS HAYDUK,
6	CHRISTOPHER HEMBERGER and
	JOSHUA RODRIGUEZ, individually
7	and on behalf of all others similarly
	situated,
8	Plaintiffs,
9	
	-against-
10	
11	GENERAL MOTORS LLC, ROBERT
	BOSCH GMBH, and ROBERT
12	BOSCH, LLC, et al.,
	Defendants.
13	
14	
	HIGHLY CONFIDENTIAL
15	
16	
17	VIRTUAL VIDEOTAPED DEPOSITION OF RYAN HARRINGTON
18	NATICK, MASSACHUSETTS
19 20	Wednesday, July 22, 2020
21	VOLUME 1
22	AOTOME I
23	REPORTED BY:
24	ROBIN CLARK, RPR, CLR
25	RODIN CHILL, RIN, CHI

1	Page 2 Virtual Videotaped Deposition of RYAN HARRINGTON, taken by Plaintiffs, pursuant to notice,	1	REMOTE APPEARANCES, continued:	Page 4
2	· · · · · · · · · · · · · · · · · · ·	2 3		
3	commencing at 10:12 a m., by and before Robin L.	3	CLEARY GOTTLIEB STEEN & HAMILTON, LLP	
4	Clark, Registered Professional Reporter and Notary	4	BY: PATRICK SWIBER, ESQ	
5	Public in and for the Commonwealth of Pennsylvania.	5	DAVID BRODSKY, ESQ RENEE GRIFFIN, ESQ	
6			2000 Pennsylvania Avenue, N W	
7		6	Washington, D C 20006	
8		7	202-947-1588 pswiber@cgsh com	
9		l ′	dbrodsky@cgsh com	
10		8	rgriffin@cgsh com	
		9	For the Defendant Robert Bosch LLC	
11		10	LLC	
12			ALSO PRESENT REMOTELY:	
13		11	CTEVEN HUDVITZ ECO	
14		12	STEVEN HURVITZ, ESQ	
15			JOELLE ROSEN	
16		13	HOWADD DDODGEV VIDEOGD A BUED	
17		14	HOWARD BRODSKY, VIDEOGRAPHER	
18			JUSTON SMITHERS	
		15		
19		16 17		
20		18		
21		19 20		
22		20		
23		22		
24		23		
25		24 25		
1 2	Page 3 REMOTE APPEARANCES:	1	INDEX	Page 5
	HAGENS BERMAN SOBOL SHAPIRO, LLP	2 3	WITNESS PAGE RYAN HARRINGTON	
3	BY: GARTH WOJTANOWICZ, ESQ STEVE BERMAN, ESQ	3	BY MR. WOJTANOWICZ: 11	
4	1301 Second Avenue, Suite 2000 Seattle, Washington 98101	4		
5	206-623-7292	5	EXHIBITS	
6	garthw@hbsslaw com steve@hbsslaw com	6	NUMBER DESCRIPTION MARKED	
	For the Plaintiffs	7 8	Harrington Exhibit 1 Expert Report of Ryan 17	
7 8		0	Exhibit 1 Expert Report of Ryan 17 Harrington	
	CARELLA, BYRNE, CECCHI, OLSTEIN, BRODY &	9		
9	AGNELLO, P C BY: JAMES E CECCHI, ESQ		Exhibit 2 Chevrolet Cruze Diesel 268	
10	ZACH BOWER, ESQ 5 Becker Farm Road	10	Discussion with EPA & CARB	
11	Roseland, New Jersey 07068	1.1	9/13/16 Document Bates	
12	973-997-1700 jcecchi@carellabyrne com	11 12	GMCOUNTS0000851587 TO 51607 Exhibit 3 Application for 287	
	zbower@carellabyne com	12	Certification 2015 Model	
13 14	For the Plaintiffs	13	Year Document Bates	
	SEEGER WEISS, LLP		GMCOUNTS000812193 to	
15	BY: SHAUNA ITRI, ESQ 1515 Market Street, Suite 1380	14	GMCOUNTS000812238	
16	Philadelphia, Pennsylvania 19102 215-564-2300	15	Exhibit 4 Certification Summary 287	
17	sitri@seegerweiss com	16	Information Report Bates GMCOUNTS000222607 to	
18	For the Plaintiffs	10	000222624	
19	KIRKLAND & ELLIS, LLP	17		
20	BY: RENEE D SMITH, ESQ JEFFREY S BRAMSON, ESQ	18		
	300 North LaSalle	19		
21	Chicago, Illinois 60654 312-862-2000	20		
22	rdsmith@kirkland com	21 22		
23	jeffrey bramson@kirkland com For the Defendant General	23		
24	Motors LLC	24		
25		25		

	P	Î	2
1	Page 22 vehicle control theory and he supported me in	1	Page 24 in your work in this case?
2	many, many cases related to diesel engine,	2	A. He helped with some of the analyses
3	diesel engine control and emissions.	3	of, you know, kind of the PEMS setup and PEMS
4	Q. What about David Anderson, what was	4	protocols in the regulatory environment kind of
5	his role in assisting you?	5	best practices related to PEMS testing.
6	A. So David is a Ph.D mechanical	6	Q. And what is Mr. Wishart's
7	engineer with a lot of experience in diesel	7	credential or specialty, do you know?
8	after treatment systems, so, you know, he kind	8	A. So I think his he has got a
9	of brought in some general support and then	9	Ph.D. It's in engineering mechanics or
10	also assisted in the analysis of some of Mr.	10	mechanical engineering. He's worked with PEMS
11	Smithers' data, the PEMS reports and then the	11	equipment in his prior work, fuel efficiency,
		12	plug-in hybrid vehicles. I'm trying to think,
		13	most of his work was kind of in the electric
		14	vehicle plug-in hybrid emissions realm with
15	role?	15	vehicles from an inspection and testing
16	A. So she was the project manager on	16	capability.
17	the project. She helped kind of, me kind of	17	Q. And Matthew Pooley, what was his
18	make sure that everything was getting done and,	18	role?
19	you know, kind of on a timely basis and then	19	A. So he helped, he's a Ph.D in
20	provided some input on testing and other	20	electrical engineering and computer science.
21	aspects.	21	So he assisted myself and David Anderson
22	Q. And then Peter, I can't read my own	22	looking through the control strategy and Mr.
23	handwriting, Peter, is it Lillo?	23	Levchenko's report.
24	A. Lillo, yes.	24	Q. And what about Sri Danthurthi?
25	Q. What was his role?	25	A. Danthurthi, so she helped with
	Page 23		Page 25
1	A. So he was the Ph.D mechanical	1	quality checking the report, so just verifying
2	engineer that performed the vehicle inspection.	2	some of the calculations and the numbers and
3	<ul> <li>Q. And did he do anything else</li> </ul>	3	making sure the footnotes and everything lined
4	significant in connection with your work in	4	up.
5	this case?	5	Q. Are all the people that you have
6	A. Most of it had to do with the	6	identified, been able to identify as people
7	vehicle inspection and looking at the ECM data	7	assisting you in preparing the report, are they
8	and helped, you know, kind of analyze the	8	all employees of Exponent?
9	findings from the inspection.	9	A. Yes.
10	Q. And that inspection you're	10	Q. Did you retain any outside
11	referring to, is that the inspection that	11	consultants in order to help you with the work
12	Defendants conducted of the diesel Cruze and	12	that you did in this case?
13	the gas Cruze vehicle that were used in the	13	A. I didn't retain any outside
14	testing that Mr. Smithers reported on?	14	support. The Analysis Group supports Kirkland
15	A. That is correct.	15	and Ellis and the client and I had some
16	Q. And Jeffrey Willard [sic], what was	16	interactions with their staff.
17	his role?	17	Q. And who did you interact with on
18	A. Jeffrey Wishart.	18	their staff?
10		19	A. Andrea Okie, Kris Comeaux, and Kerri Leonhardt.
19	Q. I'm sorry, Wishart.	20	
20	A. So he was also at the inspection	20	
20 21	A. So he was also at the inspection looking at the PEMS equipment. I believe he	21	Q. And for what purpose were you
20 21 22	A. So he was also at the inspection looking at the PEMS equipment. I believe he did the drive of the vehicle and most of his	21 22	Q. And for what purpose were you dealing with them? Why were you talking to
20 21 22 23	A. So he was also at the inspection looking at the PEMS equipment. I believe he did the drive of the vehicle and most of his focus was on the PEMS equipment and testing.	21 22 23	Q. And for what purpose were you dealing with them? Why were you talking to them?
20 21 22	A. So he was also at the inspection looking at the PEMS equipment. I believe he did the drive of the vehicle and most of his	21 22	Q. And for what purpose were you dealing with them? Why were you talking to

7		Î	
1	Page 26		Page 28
1	object and you can say if they provided	1)	THE WITNESS: Okay. So the
2	facts or data or did actual work in	2	Analysis Group did look at some of Mr.
3	connection with your report, but other	3	Smithers' data and did some data
4	than that, I would just caution to not	4	analyses on that looking at routes and
5	respond regarding communications you	5	things like that and how to kind of put
6	may have had with them, which I don't	6	together the data that Mr. Smithers
7	think is what Garth is asking, but I	7	provided. So they provided some of
8	just want to be careful.	8	that to which my staff at Exponent
9	MR. WOJTANOWICZ: Hold on,	9	reviewed and we basically redid all of
10	Renee, I would like to ask for a	10	it and then did kind of a QC to make
11	clarification. Are you indicating that	11	sure that we were correctly
12	you believe that discussions between	12	interpreting
13	Mr. Harrington and the Analysis Group	13	THE STENOGRAPHER: And did
14	are subject to attorney-client	14	kind of what, wait a minute, there was
15	privilege or work product?	15	a glitch, you did kind of what?
16	MS. SMITH: I believe it is	16	THE WITNESS: So we checked
17	subject to at least the work product	17	the data and used and made sure that
18	privilege and as Mr. Shaeffer said in	18	our analyses and compiling of Mr.
19	an email, that the communications	19	Smithers' data was consistent with the
20	between people who he may be working	20	Analysis Group just to double check
21	with may be privileged. He can talk	21	that we were all looking at the data
22	about just pursuant to Rule 26, he can,	22	correctly and understood it correctly.
23	obviously, say if facts or data was	23	BY MR. WOJTANOWICZ:
24 25	provided to him, but the actual	24 25	Q. Was the additional analysis
23	communications he's having with them,	23	performed by the Analysis Group done according
1000	Page 27		Page 29
1	yes, I will say are privileged and	1	to your instruction or specification?
2	protected	2	A. Yes, so I had worked with them and
3	BY MR. WOJTANOWICZ:	3	my staff had worked with them to instruct them
4	Q. Well, let me rephrase my question.	4	on what we were looking to do and, you know,
5	Were you communicating with the Analysis Group	5	provided guidance as to what type of analysis
6	in order to obtain facts or data that you were	7	we were planning to do.
7	using in connection with the analysis performed	111700	Q. And what type of data or analysis
8	for your report?	8	did they provide you with?
9	A. I'm sorry, I think I lost track of	9	A. So, again, as I mentioned, it was
10 11	everything. Could you restate the question?	10 11	the data that Mr. Smithers had provided, so his
12	Q. Sure. Were you communicating with the Analysis Group in order to obtain facts or	12	routes and his segments, some of the Excel files and the presentation materials that he
13	data for purposes of performing the analysis	13	provided, you couldn't always glean all the
14	described in your report?	14	information out, so it was looking to compile
15	MS. SMITH: Garth, let me	15	all of that so that we could, you know, kind of
16	clarify the objection and instructions	16	double check his analyses and then understand
17	so we're on the same page, is he can	17	how they were put together so that we could
18	disclose if Analysis Group provided	18	then analyze them ourselves.
19	facts or data, the substance of the	19	Q. So you're referring to data that
20	communications, what they were about, I	20	Mr. Smithers provided, but presumably, Analysis
	would instruct not to answer. But he	21	Group did something with that data rather than
21	Julia montact not to unswer. Dut ne	22	just giving you what Mr. Smithers already
21	can certainly provide information if	21	IIISI 21VIII2 VOII WIIAI IVII. SIIIIIIIEIS AIIEAUV
22	can certainly provide information if they provided facts or data that he	200.000	
22 23	they provided facts or data that he	23	produced, so what was the product, the work
22		200.000	

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	Page 34	,	Page 36
1	BY MR. WOJTANOWICZ:	1	BY MR. WOJTANOWICZ:
2	Q. And describe the documents for me,	2	Q. Did the Analysis Group draft any
3	would you please?	3	sections of your report?
4	A. They would have been light-duty or	4	A. I had set forth the outline of the
5	heavy-duty regulations from the code of federal	5	report and kind of the structure of it and then
6	regulations, so documents that are online that	6	at my direction, my staff helped me draft some
7	the EPA and CARB would have been putting out.	7	of it. I think the Analysis Group did assist
8	Q. Did the Analysis Group provide any	8	in drafting a few parts of it or kind of
9	summary or analysis relating to those	10	augmenting some of what we had and then my
10	regulations that they provided to you?	11	staff or myself reviewed all of that.
11	A. There wasn't a separate analyses.	12	Q. What sections of the report did the
12	I think from time to time, they provided on the	13	Analysis Group help to draft?  A. I mean, I can't remember the exact
13	report, provided some input on some of those	14	
14	things that I had asked them to do and provided	15	specifics, but I think in the appendices,
15	some edits	16	there's some discussion of the regulatory
16	MS. SMITH: Yeah, I'm just	17	requirements and testing. So if there was some input from the Analysis Group, it would have
17	going I'm sorry to interrupt, I just	18	1
18	want to caution you that in terms of	19	been mostly in those sections.  Q. Aside from information in the
19	any of the substance of draft reports,	20	
20	things like that, I would just caution,	21	appendices relating to regulatory requirements are there any other sections of the report that
21	it's fine, he can answer the question	22	you can recall the Analysis Group helping to
22	that Garth just asked, but I just want	23	draft?
23	to caution that the draft reports are and communications related thereto, we	24	A. I don't remember them helping draft
25	would maintain the privilege on.	25	any of those sections. They might have
23		23	
1	Page 35 MR. WOJTANOWICZ: It didn't	1	Page 37 provided some input on, you know, how if
2	sound like you were done with your	2	some sections didn't read very well and
3	answer there. Do you want to continue?	3	provided some thoughts there, but
4	THE WITNESS: Could you ask	4	MS. SMITH: Yeah, I'm going
5	the question again? I can't remember	5	to instruct not to answer and just to
6	what the question was.	6	be careful, like, in terms of
7	MS. SMITH: I'm sorry, I	7	commentary you're asking, in terms of
8	apologize for interrupting.	8	wording, you can answer, if Analysis
9	BY MR. WOJTANOWICZ:	9	Group did actually provided
10	Q. I was asking whether the Analysis	10	analysis, data, facts upon which you're
11	Group provided any analysis or commentary	11	relying.
12	relating to the regulatory documents that they	12	BY MR. WOJTANOWICZ:
13	sent to you?	13	Q. For the sections that the Analysis
14	MS. SMITH: Okay. I'm going	14	Group helped to draft, did you rely upon their
15	to instruct not to answer. To the	15	expertise in these areas in order to determine
16	extent there is commentary, he can	16	whether that information should be included in
17	disclose if Analysis Group provided or	17	your report?
18	did work or facts or data upon which	18	MS. SMITH: One more second.
19	Mr. Harrington relied.	19	Hold on.
20	THE WITNESS: So, again,	20	THE WITNESS: I took their
21	they provided some input into the	21	information
22	report, but I don't remember separate	22	MS. SMITH: Hold on, one
23	analyses that they had done or	23	second, sorry. Okay. You may answer.
24	communicated.	24	Sorry, I just wanted to check.
25		25	THE WITNESS: So, again, as
	<u> </u>		

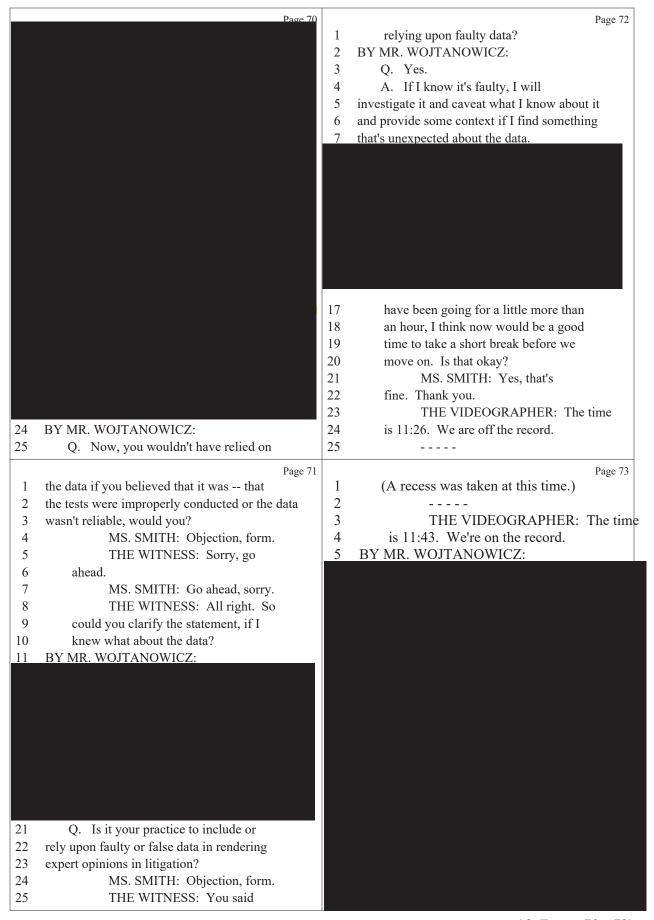
	D 20	ĥ	D 40
1	Page 38 I stated, I reviewed the information or	1	Page 40 that we knew the documents were coming.
2	my staff reviewed the information that	2	There might have been a clarifying
3	was provided, but Exponent used our	3	statement here or there, but most of it
4	expertise and my expertise to form, you	4	was in the report.
5	know, the opinions based on that	5	BY MR. WOJTANOWICZ:
6	information.	6	Q. And what did you do to you said
7	BY MR. WOJTANOWICZ:	7	that you relied on your own expertise or the
8	Q. So you formed your opinions using	8	expertise of people within Exponent to with
9	your own expertise, but in doing so, you	9	respect to the parts of the report that were
10	considered this information provided to you	10	drafted by the Analysis Group. What did you do
11	from the Analysis Group, correct?	11	in order to verify those sections using your
12	MS. SMITH: Objection, form.	12	own expertise?
13	THE WITNESS: So some of the	13	MS. SMITH: Objection, form.
14	analyses or documents they provided, I	14	THE WITNESS: So as is
15	considered, but my opinions and my	15	typical even with stuff that's drafted
16	analyses were done by myself or my	16	by Exponent, we always have another
17	staff.	17	individual read over of the documents,
18	MR. WOJTANOWICZ: Okay.	18	read over of the report, check all the
19	Renee, I would ask that General Motors	19	references, check all the calculations,
20	produce the documents between the	20	so and any part of the report, my staff
21	Analysis Group and Mr. Harrington as	21	and then myself is another QC who goes
22	part of the materials that he	22	through the report, reads it all, looks
23	considered in connection with forming	23	at the analyses, double checks the work
24	his opinions in this case.	24	for accuracy.
25	MS. SMITH: Yeah, I believe	25	
1	Page 39	4	Page 41
1	all facts and data which he considered	1	BY MR. WOJTANOWICZ:
2		2	O II
2	were produced, but we will double	2	Q. Have you spoken you're aware
3	check.	3	that there are other experts who have submitted
4	check. BY MR. WOJTANOWICZ:	3 4	that there are other experts who have submitted reports in this case on behalf of Defendants
4 5	check. BY MR. WOJTANOWICZ: Q. Did you have email communications	3 4 5	that there are other experts who have submitted reports in this case on behalf of Defendants Bosch and GM?
4 5 6	check.  BY MR. WOJTANOWICZ:  Q. Did you have email communications with the Analysis Group regarding the we're	3 4 5 6	that there are other experts who have submitted reports in this case on behalf of Defendants Bosch and GM?  A. That's my understanding.
4 5 6 7	check. BY MR. WOJTANOWICZ: Q. Did you have email communications with the Analysis Group regarding the we're not asking for the content of those	3 4 5 6 7	that there are other experts who have submitted reports in this case on behalf of Defendants  Bosch and GM?  A. That's my understanding.  Q. Have you reviewed any other expert
4 5 6 7 8	check.  BY MR. WOJTANOWICZ:  Q. Did you have email communications with the Analysis Group regarding the we're not asking for the content of those communications at this point, did you have	3 4 5 6 7 8	that there are other experts who have submitted reports in this case on behalf of Defendants Bosch and GM?  A. That's my understanding. Q. Have you reviewed any other expert reports submitted on behalf of Defendants?
4 5 6 7 8 9	check.  BY MR. WOJTANOWICZ:  Q. Did you have email communications with the Analysis Group regarding the we're not asking for the content of those communications at this point, did you have email communications or phone communications	3 4 5 6 7 8 9	that there are other experts who have submitted reports in this case on behalf of Defendants  Bosch and GM?  A. That's my understanding.  Q. Have you reviewed any other expert reports submitted on behalf of Defendants?  A. No, I have not.
4 5 6 7 8 9 10	check. BY MR. WOJTANOWICZ: Q. Did you have email communications with the Analysis Group regarding the we're not asking for the content of those communications at this point, did you have email communications or phone communications with the Analysis Group regarding the sections	3 4 5 6 7 8 9	that there are other experts who have submitted reports in this case on behalf of Defendants  Bosch and GM?  A. That's my understanding.  Q. Have you reviewed any other expert reports submitted on behalf of Defendants?  A. No, I have not.  Q. Do you know who Nick Molden is?
4 5 6 7 8 9 10 11	check.  BY MR. WOJTANOWICZ:  Q. Did you have email communications with the Analysis Group regarding the we're not asking for the content of those communications at this point, did you have email communications or phone communications with the Analysis Group regarding the sections of the report that they drafted?	3 4 5 6 7 8 9 10 11	that there are other experts who have submitted reports in this case on behalf of Defendants Bosch and GM?  A. That's my understanding. Q. Have you reviewed any other expert reports submitted on behalf of Defendants? A. No, I have not. Q. Do you know who Nick Molden is? A. I'm aware of who he is, but I don't
4 5 6 7 8 9 10 11 12	check.  BY MR. WOJTANOWICZ:  Q. Did you have email communications with the Analysis Group regarding the we're not asking for the content of those communications at this point, did you have email communications or phone communications with the Analysis Group regarding the sections of the report that they drafted?  A. Can you ask the question again?	3 4 5 6 7 8 9 10 11 12	that there are other experts who have submitted reports in this case on behalf of Defendants Bosch and GM?  A. That's my understanding. Q. Have you reviewed any other expert reports submitted on behalf of Defendants? A. No, I have not. Q. Do you know who Nick Molden is? A. I'm aware of who he is, but I don't know him. I haven't seen anything from him.
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4 5 6 7 8 9 10 11 12 13 14 15	check.  BY MR. WOJTANOWICZ:  Q. Did you have email communications with the Analysis Group regarding the we're not asking for the content of those communications at this point, did you have email communications or phone communications with the Analysis Group regarding the sections of the report that they drafted?  A. Can you ask the question again?  Q. Sure. Did you have telephone or email communications with the Analysis Group regarding the sections of the report that they	3 4 5 6 7 8 9 10 11 12 13 14 15	that there are other experts who have submitted reports in this case on behalf of Defendants Bosch and GM?  A. That's my understanding. Q. Have you reviewed any other expert reports submitted on behalf of Defendants? A. No, I have not. Q. Do you know who Nick Molden is? A. I'm aware of who he is, but I don't know him. I haven't seen anything from him. Q. So you've not reviewed the report that he submitted in this case?
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20	Page 54	920	Page 56
1	THE WITNESS: Not that I can	1	after-treatment systems operate.
2	remember.	2	Q. So, for example, if you turn to
3	BY MR. WOJTANOWICZ:	3	your report, Exhibit No. 1, near the back, and
4	Q. So you've already testified that	4	it gets kind of difficult because the pages
5	the Analysis Group helped you by writing some	5	aren't totally sequential through the
6	sections of the report and appendices. Did any	6	appendices, but there's Appendix D, Overview of
7	others at Exponent write any of the or help	7	Diesel Vehicle Emissions. Is this one of the
8	you by writing sections of the report?	8	sections that was derived in whole or in part
9	MS. SMITH: Objection, form,	9	from work that you had performed in other
10	compound. Misstates his testimony.	10	diesel cases?
11	THE WITNESS: So I mentioned	11	MS. SMITH: I just want to
12	the key staff that helped me draft the	12	just caution Mr. Harrington to the
13	report. There were a few others that	13	extent the work is as a consulting
14	may have supported or done some QC of	14	expert and has not been disclosed, I
15	the report, but I can't remember who	15	just want to be careful not to waive
16	would have done what or all their names	16	any privilege that he may have, that
17	at this point.	17	other companies may have or other
18	BY MR. WOJTANOWICZ:	18	entities may have.
19	Q. Were there sections of the report	19	THE WITNESS: You said
20	that you personally consider yourself to be the	20	Appendix D, which page?
21	principal drafter of?	21	BY MR. WOJTANOWICZ:
22	A. So I set forth the outline, the key	22	Q. Well, Appendix D starts at page 1
23	points, the summaries and the opinions and then I typically start at all the different sections	23	of Appendix D, but it's after the very end of your reliance materials section. There's no
25	and then others kind of filled in based on my	25	other way really to so after page C60, which
23	and then others kind of filled in based on my	23	other way really to so after page Coo, which
	Page 55		D 67
		1	Page 57
1	direction.	1	is page 60 of Appendix C.
2	direction.  Q. Did anyone other than people at	2	is page 60 of Appendix C.  A. Yeah, we had a problem with the
2	direction.  Q. Did anyone other than people at Exponent and people at the Analysis Group draft	2	is page 60 of Appendix C.  A. Yeah, we had a problem with the page number on the pdfs, so they're by
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	23	THE WITNESS: I should be		
Q. So you said you're referring to the		able to to do that.		
	25		25	Q. So you said you're referring to the

1)	Page 62 inspection of the Cruze diesel and gasoline	1	A. No, I have not.
2	test vehicles in this case, correct?	2	Q. Did you in determining how you
3	A. Correct, we analyzed the vehicle	3	were going to perform your analysis in this
4	and assessed the vehicle, but we didn't do any	4	case, did you consider conducting PEMS testing
5	PEMS testing looking at the emissions of the	5	on a vehicle, the Cruze vehicle for this case?
6	vehicle.	6	MS. SMITH: Objection, form.
7	Q. Were you present at the vehicle	7	THE WITNESS: When I was
8	inspection?	8	first retained, you know, I was trying
9	A. I was not.	9	to understand the testing that
0	Q. So and is it your understanding	10	Mr. Smithers had done and as I got into
1	that the PEMS equipment that was used in	11	it and realized some of the methodology
2	connection with testing those vehicles was	12	issues and the issues with the vehicle,
3	available at that vehicle inspection	13	there seemed to be so many issues with
1	A. Correct.	14	the vehicle that at that point it
5	Q correct? But at that time,	15	didn't seem necessary to do any
5	neither you nor anyone working under your	16	additional testing.
-		17	BY MR. WOJTANOWICZ:
7	direction attempted to perform an actual PEMS test using that equipment, correct?	18	Q. So did you determine fairly early
)		19	
-	MS. SMITH: Objection, form. THE WITNESS: That is	100	on in your review of the case that you didn't feel you needed to conduct any vehicle testing
0	correct. We couldn't drive the vehicle	20	
2	The control of the co	21 22	on your own, correct?
3	off of our property, because the	23	MS. SMITH: Objection, form. THE WITNESS: It evolved
= 4	vehicle wasn't registered and the	3.95 Cm.	
5	vehicle had active MIL lights and some	24 25	over time, you know, there was some
)	other maintenance issues, so we were	23	tighter deadlines and as things got
	Page 63		Page 65
l	unable to do any testing.	1	extended, obviously, as I continued to
2	BY MR. WOJTANOWICZ:	2	evaluate the data by Mr. Smithers and
3	Q. The fact that you couldn't drive	3	his testing on the timelines, you know,
4	the vehicle off the property would not prevent	4	I continued to evaluate that, but
5	you from actually hooking up and driving the	5	given, you know, early assessments and
5	vehicle with the PEMS equipment active, would	6	then the continued assessment, but it
7	it?	7	didn't change my opinion of that.
8	MS. SMITH: Objection, form.	8	BY MR. WOJTANOWICZ:
)	THE WITNESS: No, we could	9	Q. So I believe that the primary
)	have, but with the condition of the	10	reason you stated for deciding you didn't wan
	vehicle and, you know, driving around	11	or need to conduct any emissions testing on a
2	the test track would have been	12	Cruze vehicle for this case was that you had
3	difficult to do any kind of, you know,	13	identified what you thought were issues with
1	on-road testing had, you know, there	14	the Cruze test vehicles, correct?
5	wasn't as much as value especially	15	MS. SMITH: I'm just going
5	given the condition of the vehicle.	16	to object sorry, objection, form.
7	BY MR. WOJTANOWICZ:	17	And objection to the extent you're
8	Q. Aside from the vehicle inspection	18	calling for a legal conclusion about
)	that people working under your direction	19	what would be needed or not needed to
)	attended, you have not conducted any PEMS	20	do for this case.
I)	testing of any Cruze vehicles for purposes of	21	THE WITNESS: Could you
2	this report, correct?	22	restate the question or read it back?
3	A. That is correct.	23	BY MR. WOJTANOWICZ:
1	Q. Have you ever performed emissions		
5	testing on any Cruze vehicle for any purpose?		

7	27.19	ĥ	
	Page 66	1	Page 68
		1 2	Misstates testimony, vague.  THE WITNESS: So that data
		3	in addition to the other data and
		4	testing that GM needed to do to develop
		5	
		6	a program. BY MR. WOJTANOWICZ:
		7	Q. But you felt that that testing was
		8	sufficiently reliable for you to use it in
		9	rendering your opinions in this case; that's
		10	correct, right?
		11	MS. SMITH: Objection, form.
		12	THE WITNESS: So that
		13	testing was reliable in addition to the
		14	other information that was available.
		15	BY MR. WOJTANOWICZ:
		16	Q. Okay. But I'm trying to I want
		17	to separate these. You said you had three
		18	sources of the testing information that you
19	BY MR. WOJTANOWICZ:	19	reviewed and relied on, one of them, the
20	Q. So in your opinion, the data that	20	certificate of conformity testing and data,
21	you were able to review from testing performed	21	in-use testing data,
22	by General Motors was sufficiently reliable for		
23	you to rely on that date for purposes of	23	A. Correct.
24	rendering your opinion in this case?	24	Q. So the certificate of conformity
25	MS. SMITH: Objection, form.	25	data, taking it by myself, did you consider
		_	
	Page 67		Page 69
1	Page 67 Objection, misstates his testimony.	1	Page 69 that data sufficiently reliable for you to use
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2 3	Objection, misstates his testimony.	1	that data sufficiently reliable for you to use
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-	Page 78	40	Page 80
1	and others, some emails about, you	1	is really kind of the combination of
2	know, some questions they were asking	2	the two of those is using a PEMS unit
3	about the PEMS data, so that's some of	4	to do on-road testing of emissions.  BY MR, WOJTANOWICZ:
4	the information that I saw.	5	The state of the s
5	BY MR. WOJTANOWICZ:	6	Q. Again, I am not asking about the
6	Q. The bottom line is you don't know	7	other kinds of tests you may or may not have
7 8	how deeply the EPA dug into any of this testing data other than the fact that this data was	8	performed, I'm asking you specifically about
9		9	PEMS testing for purposes of analyzing diesel vehicle emissions. So if you can answer my
10	given to it, right?	10	question, please. Have you ever conducted a
11	MS. SMITH: Objection, form. Misstates testimony.	11	PEMS test for the purpose of analyzing diesel
12	THE WITNESS: So that	12	vehicle emissions?
13		13	MS. SMITH: Objection, form.
14	information is typically not made public. So I didn't see anything	14	THE WITNESS: I think I
15	specific to that, you know, exactly	15	answered that, but I said I had not
16	what they did in relation to that data	16	conducted PEMS testing. I provided
17	that was submitted.	17	some context to the other testing, but
18	BY MR. WOJTANOWICZ:	18	I think I clearly stated I hadn't
19	Q. Is it your opinion that any	19	conducted PEMS testing on a diesel
20	information submitted to the EPA is inherently	20	vehicle.
21	reliable because of the potential scrutiny that	21	BY MR. WOJTANOWICZ:
22	it's subject to?	22	Q. Have you ever conducted a PEMS tes
23	A. Could you restate that question?	23	for purpose of analyzing emissions on a
24	Q. Is it your opinion that any	24	gasoline vehicle?
25	information or data submitted to the EPA is	25	A. I have not.
30000			
1	Page 79 inherently more reliable just because it's		Page 81
1			O Have you aver designed test route
		1	Q. Have you ever designed test route
2	submitted to the EPA?	2	for purpose of running a PEMS test to analyze
2 3	submitted to the EPA?  A. I don't know if you can say it is	2	for purpose of running a PEMS test to analyze emissions on a diesel or gasoline vehicle?
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	Page 82	ĥ	Page 84
1	A. I have not.	1	about how the Sensors, Inc. PEMS unit works?
2	Q. Have you received any formal	2	MS. SMITH: Objection, form.
3	training in using a PEMS analyzer?	3	THE WITNESS: I don't
4	A. Again, not a PEMS analyzer, I've	4	remember if I asked him to call or if I
5	done other emissions analytics, but not a	5	had asked him some questions and he
6	specific PEMS unit.	6	thought it was he needed to clarify
7	Q. Have you received, for example, any	7	it with them, I can't remember the
8	informal training, like attended a seminar or a	8	exact specifics of the conversation.
9	demonstration by a manufacturer of a PEMS unit	9	BY MR. WOJTANOWICZ:
10	to learn how the PEMS unit works?	10	Q. You're aware, aren't you, that
11	MS. SMITH: Objection, form.	11	Sensors, Inc. was the manufacturer of the PEMS
12	THE WITNESS: I have not.	12	unit that Mr. Smithers used in his testing
13	BY MR. WOJTANOWICZ:	13	program?
14	Q. Was the use of a PEMS unit the part	14	A. Yes, the Semtech unit, yes.
15	of any aspect of your formal education? I know	15	Q. Have you personally reviewed the
16	we'll go into that later, but have you had any	16	user's manuals or the manuals for the Semtech
17	classes or formal university training that	17	PEMS unit?
18	relates specifically to the use of a PEMS unit?	18	MS. SMITH: Objection, form.
19	A. When I went to school, PEMS units	19	THE WITNESS: I can't say
20	weren't typically in use or hadn't been very	20	that I reviewed every aspect of it, but
21	widespread in use.	21	I did review the materials and some of
22	Q. Okay. So the answer is no, there	22	the owner's manual pieces of that
23	weren't any classes offered at the time you	23	Semtech unit.
24	were in school that related to how to set up or	24	BY MR. WOJTANOWICZ:
25	use a PEMS unit?	25	Q. What parts of the owner's manual do
	Page 83		Page 85
1	A. Not specific to a PEMS unit, no.	1	you recall reviewing?
2	A. Not specific to a PEMS unit, no. It was on-road testing in itself.	2	you recall reviewing?  A. There was the discussion of
3	<ul><li>A. Not specific to a PEMS unit, no.</li><li>It was on-road testing in itself.</li><li>Q. In connection with your work on</li></ul>	3	you recall reviewing?  A. There was the discussion of operating PEMS temperatures. I think some of
3 4	A. Not specific to a PEMS unit, no.  It was on-road testing in itself.  Q. In connection with your work on this case, have you spoken with any PEMS unit	3 4	you recall reviewing?  A. There was the discussion of operating PEMS temperatures. I think some of the setup pieces, but it was a while ago, so I
2 3 4 5	A. Not specific to a PEMS unit, no.  It was on-road testing in itself.  Q. In connection with your work on this case, have you spoken with any PEMS unit manufacturers regarding the proper use of PEMS	2 3 4 5	you recall reviewing?  A. There was the discussion of operating PEMS temperatures. I think some of the setup pieces, but it was a while ago, so I can't remember the exact sections.
2 3 4 5 6	A. Not specific to a PEMS unit, no.  It was on-road testing in itself.  Q. In connection with your work on this case, have you spoken with any PEMS unit manufacturers regarding the proper use of PEMS equipment?	2 3 4 5 6	you recall reviewing?  A. There was the discussion of operating PEMS temperatures. I think some of the setup pieces, but it was a while ago, so I can't remember the exact sections.  Q. Have you ever testified as an
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1	BY MR. WOJTANOWICZ:	1	written report. The California arbitration
2	Q. So in that case, you were able to	2	cases are a little bit different, but the other
3	analyze some PEMS test results conducted by	3	ones had a full report with them.
4	Volkswagen on its own vehicles; is that	4	Q. Have you ever been asked to conduct
5	correct?	5	PEMS testing on a vehicle for purposes other
6	A. And West Virginia's PEMS testing,	6	than litigation? And to the extent that you
7	correct.	7	are were asked as a consulting expert, I
8	Q. And the West Virginia PEMS testing,	8	don't know the substance, I want to know
9	was that a study done by some people at West	9	whether you have been asked to actually just
10	Virginia University related to diesel vehicle	10	conduct a PEMS testing for purposes other than
11	emissions using analyzed using a PEMS setup?	11	the litigation?
12	A. That is correct.	12	A. I can't recall a request like that.
13	Q. And you provided deposition	13	Q. Have you ever been asked to
14	testimony is that case; is that correct?	14	interpret or analyze the validity of PEMS
15	A. That is correct.	15	testing data for purposes other than
16	Q. Did you or anyone under your	16	litigation?
17	direction perform PEMS testing with respect to	17	A. Not off the top of my head, I can't
18	that Volkswagen case where you offered	18	recall a request like that.
19	testimony relating to PEMS testing?	19	Q. And then a slight variation on
20	A. No.	20	these questions and, again, without wanting to
21	Q. Did you issue a written report in	21	know the substance, have you ever conducted
22	that case?	22	PEMS testing for purposes of litigation where
23	A. Yes.	23	you were not disclosed as a testifying expert?
24	Q. And you said then you provided	24	A. No.
25	testimony that was deposition testimony?	25	Q. Have you ever been in a situation
23	- P	Same of	
23	Page 87		Page 89
1		1	
	Page 87  A. Correct.  Q. Was there a trial? Did you give	1 2	Page 89 where you directed other people to conduct PEMS testing for you for purposes of litigation
1	Page 87  A. Correct.	1 2 3	Page 89 where you directed other people to conduct PEMS testing for you for purposes of litigation where you were working under the auspices of
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	Page 87  A. Correct.  Q. Was there a trial? Did you give any trial testimony?  A. I did not.  Q. Okay. Any other case that you are aware of or that you recall in which you provided testimony regarding PEMS testing?  A. No, there was it's, obviously, in my appendix, there was some arbitrations that were related to Volkswagen that would have been the similar opinions, but I think that was all confidential, but it's very similar to the other reports that I mentioned.  Q. Okay. And we'll go through those later, but and I was just trying to, for the purpose of fairness, those are cases that you provided testimony, like, where you actually gave deposition or trial testimony; is that correct?  A. Deposition or arbitration testimony, correct.  Q. Okay. In all of those cases, did	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	where you directed other people to conduct PEMS testing for you for purposes of litigation where you were working under the auspices of being a consultant, not a testifying expert?  A. No.  Q. Did you conduct any tests on PEMS equipment, meaning any tests analyzing how PEMS equipment works in connection with your work in this case?  MS. SMITH: Objection, form.  THE WITNESS: Could you ask the question again?  BY MR. WOJTANOWICZ:  Q. Sure. Did you personally, let's start personally, did you personally conduct any tests of PEMS equipment in connection with your opinions in this case?  A. Other than what was done at the inspection, which wasn't testing of the system per se, no.  Q. So you weren't present at the inspection, correct?

	D	ĥ	D 02
1	Page 90 you have not conducted any testing on PEMS	1	Page 92 the PEMS equipment, that's correct.
2	equipment for purposes of this opinion	2	Q. Are you aware of the process by
3	personally?	3	which the PEMS units can be calibrated to
4	A. That is correct.	4	determine if they're measuring the correct
5	Q. Now, you're aware that during the	5	amount of gas?
6	vehicle inspection of the test Cruze vehicles	6	A. So my understanding is that the
7	in this case, that the PEMS units were present	7	exhaust flow meter is calibrated by the Semtech
8	at the inspection and available for inspection	8	unit itself and then before and after the test,
9	as well, correct?	9	you need to do a zero and span gas test, which
10	MS. SMITH: Objection, form.	10	is not something that Mr. Smithers stated in
11	THE WITNESS: Correct.	11	his report and we tried to track down if that
12	BY MR. WOJTANOWICZ:	12	information exists, but that wasn't mentioned
13	Q. Are you aware that those machines	13	in his report, but he did say he calibrated
14	were not tested or analyzed during that	14	them before and after, but I never saw anything
15	inspection?	15	about the span or zero gas that he used.
16	MS. SMITH: Objection, form,	16	BY MR. WOJTANOWICZ:
17	foundation.	17	Q. And you didn't instruct the people
18	THE WITNESS: They were	18	attending the inspection on your behalf to
19	what?	19	perform a zero and span test, did you?
20	BY MR. WOJTANOWICZ:	20	A. That's my understanding, I don't
21	Q. Are you aware that those machines	21	remember asking them to do them.
22	were not tested or analyzed during those	22	Q. Why not?
23	vehicle inspections?	23	A. Because we weren't we weren't
24	A. My understanding, they were	24	doing testing, so, you know, we could have
25	inspected, but they were not, yes, tested,	25	looked at the calibration at that point, but
	D 01		
	Page 91		Page 93
1)	during the inspection.	1	that wouldn't have told us anything about the
2	during the inspection.  Q. Are you aware that the machines	2	that wouldn't have told us anything about the calibrations or how the system was operating
2	during the inspection.  Q. Are you aware that the machines were not even turned on by the people	3	that wouldn't have told us anything about the calibrations or how the system was operating when Mr. Smithers was doing his testing.
3 4	during the inspection.  Q. Are you aware that the machines were not even turned on by the people conducting the inspection?	3 4	that wouldn't have told us anything about the calibrations or how the system was operating when Mr. Smithers was doing his testing.  Q. Other than requesting a visual
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2 3 4 5 6 7	during the inspection.  Q. Are you aware that the machines were not even turned on by the people conducting the inspection?  MS. SMITH: Objection, form.  THE WITNESS: I can't remember exactly, but that seems	2 3 4 5 6 7	that wouldn't have told us anything about the calibrations or how the system was operating when Mr. Smithers was doing his testing.  Q. Other than requesting a visual inspection of the PEMS units, did you ask the people attending the inspection on your behalf to conduct any other inspection or analysis of
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	Page 94	-	Page 96
1	were supposed to be?	1	Q. Were you aware that as part of the
2	A. So my memory is that it was verbal.	2	vehicle inspection protocol you referred to
3	There may have been a protocol, but for some	3	earlier, the parties were supposed to exchange
4	reason, I can't remember if there was one.	4	any information that they gleaned during the
5	There was one I know when I think it was shared	5	course of the inspection?
6	with you, you know, talking about what was	6	MS. SMITH: Objection.
7	going to be done at the inspection. That was	7	Objection. That protocol speaks for
8	something that, you know, was written down	8	itself and to the extent that it calls
9	about what was going to be done during the	9	for a legal conclusion and foundation
10	inspection at kind of a high level.	10	on what was required and agreed to
11	Q. So that protocol, you're referring	11	among the attorneys.
12	to the protocol agreed to among the parties for	12	MR. WOJTANOWICZ: You can
13	what things could be inspected and what kind of	13	answer.
14	notice needed to be provided; is that correct?	14	THE WITNESS: Can you ask
15	MS. SMITH: Objection, form.	15	the question again?
16	THE WITNESS: That's	16	BY MR. WOJTANOWICZ:
17	correct.	17	Q. Were you aware that the protocol,
18	BY MR. WOJTANOWICZ:	18	the inspection protocol we referred to earlier
19	Q. Aside from that, you're not aware	19	called for the parties to exchange information
20	of any other written protocol detailing the	20	they gleaned during the course of that
21	steps that you wanted to have taken during this	21	inspection?
22	vehicle inspection?	22	MS. SMITH: Same objection.
23	A. Since it was a one-day test, and	23	THE WITNESS: It has been a
24	you know, just an inspection, or one-day	24	while since I read it. I vaguely
25	inspection, we weren't doing testing, I believe	25	remember something about, yeah, the
	Page 95		Page 97
1	it was all verbal, but I would have to go back	1	information needed to be exchanged, but
2	and see if something was documented, but I	2	I don't remember the specifics that was
3	don't remember off the top of my head.	3	listed in there.
4	<ol><li>Q. You say you weren't doing testing,</li></ol>	4	BY MR. WOJTANOWICZ:
5	but the people working for you did actually	5	Q. Do you know whether all of the
6	take both vehicles out for test drives; isn't	6	
7		0	information that the people working under your
	that right?	7	direction obtained from that inspection was
8	A. Correct. So a good clarification,	323	: 11년 : 동안 15일 전 경영 (15 15 ) 등 전 경영 (15 15 15 ) 등 전 경영 (15 15 15 ) 등 전 경영 (15 15 15 15 ) 등 전 경영 (15 15 15 15 15 15 15 15 15 15 15 15 15 1
9	A. Correct. So a good clarification, so there was test drives, there wasn't	7	direction obtained from that inspection was
9 10	A. Correct. So a good clarification, so there was test drives, there wasn't emissions testing being done that day.	7 8	direction obtained from that inspection was provided to Plaintiffs in this case?
9 10 11	A. Correct. So a good clarification, so there was test drives, there wasn't emissions testing being done that day.  Q. So where are the written protocols	7 8 9 10 11	direction obtained from that inspection was provided to Plaintiffs in this case? MS. SMITH: Objection, form,
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9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	A. Correct. So a good clarification, so there was test drives, there wasn't emissions testing being done that day.  Q. So where are the written protocols for how the people working for you at that inspection were supposed to conduct those test drives?  A. So, again, I can't remember if they were documented or they weren't. So if they were, I can try to find them, but I can't remember at this point.  Q. Okay. If they were, would you have cited them in your report as among the materials you relied on in rendering your opinions in this case?  A. Yes, unless I had forgotten about them, but typically, we would have, so we can	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	direction obtained from that inspection was provided to Plaintiffs in this case?  MS. SMITH: Objection, form, foundation.  THE WITNESS: That's my understanding.  BY MR. WOJTANOWICZ:  Q. Did you provide all of the information that the people working for you gathered at that inspection to counsel for that purpose or for any purpose?  A. That's my understanding.  Q. Were you aware that there were no, let me back up a little bit. How, if at all, did you learn about what happened during the course of that vehicle inspection?  A. I talked to Peter and Jeff about what they had found, had run through kind of
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	A. Correct. So a good clarification, so there was test drives, there wasn't emissions testing being done that day.  Q. So where are the written protocols for how the people working for you at that inspection were supposed to conduct those test drives?  A. So, again, I can't remember if they were documented or they weren't. So if they were, I can try to find them, but I can't remember at this point.  Q. Okay. If they were, would you have cited them in your report as among the materials you relied on in rendering your opinions in this case?  A. Yes, unless I had forgotten about	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	direction obtained from that inspection was provided to Plaintiffs in this case?  MS. SMITH: Objection, form, foundation.  THE WITNESS: That's my understanding.  BY MR. WOJTANOWICZ:  Q. Did you provide all of the information that the people working for you gathered at that inspection to counsel for that purpose or for any purpose?  A. That's my understanding.  Q. Were you aware that there were no, let me back up a little bit. How, if at all, did you learn about what happened during the course of that vehicle inspection?  A. I talked to Peter and Jeff about

1			
	Page 98 draft those sections kind of outlining what the	1	Page 100 BY MR. WOJTANOWICZ:
2	findings were for the report.	2	
			Q. And the two ways that you were able
3	Q. Peter and Jeff, you're referring to Peter Lillo and Jeff Wishart?	3	to determine what they had gleaned and their
4		4	expertise were the verbal conversation you had
5	A. Yes, sorry, correct.	5	with them and the information that they put
6	Q. So there was, you had a verbal	6	into the draft report; isn't that right?
7	exchange with those two individuals regarding	•	A. That is correct.
8	what they observed during the course of the	8	Q. Are you aware that there were other
9	inspection, correct?	9	people at the vehicle inspection associated
10	A. Correct.	10	with other parties parties other than
11	Q. Did they summarize their findings	11	Exponent and other than Plaintiffs? In other
12	for you in any way?	12	words, there were third-parties' experts, for
13	A. So the summaries are what's in the	13	lack of a better term, present at the vehicle
14	report.	14	inspection?
15	Q. So other than the sections that you	15	MS. SMITH: Objection, form.
16	asked them to draft in the report related to	16	THE WITNESS: You said third
17	the inspection, there were no other summaries	17	parties? I guess, I'm not sure who
18	that they made for you of what they observed	18	you're talking about.
19	during the inspection?	19	BY MR. WOJTANOWICZ:
20	MS. SMITH: Objection, form.	20	Q. Okay. Let me just rephrase this.
21	THE WITNESS: Yeah, that's	21	Is it your understanding that there were
22	my memory is that everything was just	22	consultants or experts associated with Bosch,
23	drafted into the report.	23	the Defendant Bosch in this case that were also
24	BY MR. WOJTANOWICZ:	24	present at the inspection?
25	Q. Now, I mean, this report doesn't	25	MS. SMITH: Objection, form.
	Page 99		Page 101
1	have Jeffrey Lillo I'm sorry, I'm mixing	1	THE WITNESS: My
2	them up. It doesn't have Peter Lillo's name on	2	understanding is that Bosch had some
3	it, does it?	3	representatives there. I don't
4	MS. SMITH: Objection, form.	4	remember exactly who they were, but I
5	THE WITNESS: Sorry. It	5	was aware that Bosch had some
6	does not.	-	
		6	representatives there.
7	BY MR. WOJTANOWICZ:	7	representatives there. BY MR. WOJTANOWICZ:
7 8		555	BY MR. WOJTANOWICZ:
-33	BY MR. WOJTANOWICZ:  Q. It doesn't have Jeffrey Wishart's name on it, does it?	7	BY MR. WOJTANOWICZ:  Q. Were you aware that General Motors
8	Q. It doesn't have Jeffrey Wishart's name on it, does it?	7 8	BY MR. WOJTANOWICZ:  Q. Were you aware that General Motors also had some representatives there who were
8	Q. It doesn't have Jeffrey Wishart's name on it, does it?  A. That's correct. Again, as I stated	7 8 9	BY MR. WOJTANOWICZ:  Q. Were you aware that General Motors also had some representatives there who were not employees of Exponent?
8 9 10	Q. It doesn't have Jeffrey Wishart's name on it, does it?  A. That's correct. Again, as I stated in the beginning, so everything was done at my	7 8 9 10	BY MR. WOJTANOWICZ:  Q. Were you aware that General Motors also had some representatives there who were
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	Page 110	-	Page 112
1	for you, Peter and Jeff, with instructions	1	Q. Sure. I'm just asking aside from
2	about the speeds that they should achieve	2	the inspections of the test vehicles we have
3	during the course of the test drive of the	3	been discussing, have you or anyone working
4	diesel test vehicle?	4	under your direction conducted any other
5	A. I don't remember a specific	5	inspection of a Cruze vehicle in connection
6	discussion other than, you know, drive some,	6	with your work in this case?
7	stop and go, and some high speed driving, but	7	A. No.
8	it wasn't a prescriptive profile, no.	8	Q. Have you ever inspected any other
9	Q. And these were oral instructions,	9	Cruze vehicle for any other purpose?
10	it wasn't a written protocol for how to conduct	10	A. Not that I can recall.
11	these tests?	11	Q. So you identified earlier, you said
12	A. That's correct. It was more of a	12	that Jeff Wishart had experience with PEMS
13	test drive, not an actual emissions test.	13	testing, correct?
14	Q. Okay. Did you provide Peter and	14	A. He had been part of system PEMS
15	Jeff with instructions about the duration of	15	testing, that's correct.
16	time as opposed to length and distance that	16	Q. Is there anyone else who was
17	they should conduct their test drive of the	17	working on, among the people assisting you in
18	diesel test vehicle?	18	your work in this case, that to your knowledge
19	MS. SMITH: Objection, form.	19	has experience with PEMS testing?
20	THE WITNESS: Again, since	20	A. There's others that have done
21	we weren't doing any affirmative	21	emissions testing, but specific to PEMS, I do
22	testing, I don't think there was any	22	not believe so.
23	specifics about the amount of time to	23	Q. For purposes of your opinions in
24	drive the vehicle.	24	this case to the extent that you are relying on
25		25	inputs from your team, is it fair to say Jeff
9			
1	Page 111 BY MR. WOJTANOWICZ:	1	Page 113 Wishart is the one whose experience you were
2	Q. Did you instruct Peter and Jeff	2	drawing on to reach your opinions in this case?
3	with respect to the length of time, distance,		
		3	MS SMITH: Objection form
74.55		3	MS. SMITH: Objection, form.
4	that the gas test vehicle should be driven?	4	THE WITNESS: So in part,
5	that the gas test vehicle should be driven?  MS. SMITH: Objection, form.	5	THE WITNESS: So in part, some of his information, myself and my
4 5 6	that the gas test vehicle should be driven?  MS. SMITH: Objection, form.  THE WITNESS: No, if I	5 6	THE WITNESS: So in part, some of his information, myself and my staff have done some work looking at
4 5 6 7	that the gas test vehicle should be driven?  MS. SMITH: Objection, form.  THE WITNESS: No, if I remember correctly, it was the same	4 5 6 7	THE WITNESS: So in part, some of his information, myself and my staff have done some work looking at PEMS data, understanding, you know,
4 5 6 7 8	that the gas test vehicle should be driven?  MS. SMITH: Objection, form.  THE WITNESS: No, if I remember correctly, it was the same instructions for the diesel or	4 5 6 7 8	THE WITNESS: So in part, some of his information, myself and my staff have done some work looking at PEMS data, understanding, you know, best practices with PEMS data, how it
4 5 6 7 8 9	that the gas test vehicle should be driven?  MS. SMITH: Objection, form.  THE WITNESS: No, if I remember correctly, it was the same instructions for the diesel or something similar to it.	4 5 6 7 8 9	THE WITNESS: So in part, some of his information, myself and my staff have done some work looking at PEMS data, understanding, you know, best practices with PEMS data, how it has been conducted and, again, you
4 5 6 7 8 9 10	that the gas test vehicle should be driven?  MS. SMITH: Objection, form.  THE WITNESS: No, if I remember correctly, it was the same instructions for the diesel or something similar to it.  BY MR. WOJTANOWICZ:	4 5 6 7 8 9	THE WITNESS: So in part, some of his information, myself and my staff have done some work looking at PEMS data, understanding, you know, best practices with PEMS data, how it has been conducted and, again, you know, PEMS data is really the
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	D 114	1	D 116
1	Page 114 mechanical engineering or engineering	1	Page 116 in vehicles or in the energy space. I think
2	mechanics.	2	it's between 10 or 15 years, including some of
3	Q. Do you have any idea what his work	3	his academic roles.
4	background is, where he has worked before	4	Q. Do you know approximately how old
5	Exponent?	5	he is just to get a sense of how long he has
6	A. He worked at Intertek for a time, I	6	been out in the workforce as opposed to just
7	think on electric vehicle and plug-in vehicle	7	being in school?
8	testing and where he did some PEMS testing.	8	MS. SMITH: Objection, form.
9	And he worked for a couple of other energy	9	THE WITNESS: Actually, I do
10	providers and then he was an adjunct professor		not know how old he is. And I guess I
11	at Arizona State University. I can't remember	11	could go back and look at when he
12	the exact or which department it is, but	12	graduated, but I don't know how old he
13	there's classes on vehicles and energy that he	13	is.
14	teaches.	14	BY MR. WOJTANOWICZ:
15	Q. I'm a little confused. You said	15	Q. Can you ballpark it, does he appear
16	that he worked for an electrical and plug-in	16	to be under 40, under 50?
17	vehicle manufacturer; is that right?	17	MS. SMITH: Objection, form.
18	A. I'm sorry, at Intertek, he did some	18	THE WITNESS: If I had to
19	test on plug-in hybrid and hybrid vehicles, so	19	guess, he's probably in his thirties or
20	vehicle testing and emissions testing.	20	forties.
21	Q. So hybrid vehicles as well, not	21	BY MR. WOJTANOWICZ:
22	just full electric vehicles?	22	Q. What training has Mr. Wishart had
23	A. I believe so, that is correct, but	23	in conducting PEMS tests?
24	I would have to double check on that, but I	24	A. I don't know if I can remember the
25	thought it was plug in, hybrid, and electric	25	testing he's had. I believe he had worked with
20			Approximate Quantum properties and approximate the properties of t
20			Page 117
1	Page 115 vehicles.	1	
9	Page 115	1 2	Page 117
1	Page 115 vehicles.		Page 117 one of the manufacturers prior to coming to
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7	P 110	m	D 100
1	Page 118 the specifics.	1	Page 120 some other cases relating to Volkswagen, you
2	Q. Do you know how many PEMS tests Mr.	2	have given testimony regarding PEMS tests and
3	Wishart has done?	3	written reports regarding PEMS tests. Was Mr.
4	A. I do not.	4	Wishart also assisting you in those cases?
5	Q. Do you have any sense of scale? Is	5	A. I believe most of those reports
6	it, you know, has he done five, ten, a	6	were written prior to Dr. Wishart becoming an
7	thousand?	7	employee of Exponent. So I don't think he
8	A. I would say in the single to double	8	drafted any of it. There may have been some of
9	digit range.	9	the later reports that he was, when he was
10	Q. And what's your basis for giving me	10	employed that I may have asked him to look at a
11	that estimate, if you have one?	11	few things, but I think most of the drafting
12	A. In talking to him about some of the	12	was done prior to him coming on board.
13	prior work that he had at Intertek that's, you	13	Q. Now, since you've never conducted a
14	know, kind of an estimate from what I remember	14	PEMS test yourself, are you relying on the
15	from those discussions and different programs	15	experience of Mr. Wishart in order to
16	he was on.	16	substantiate your opinions regarding whether
17	Q. Did Mr. Wishart write any parts of	17	Mr. Smithers' PEMS tests were conducted
18	the report that specifically discuss PEMS	18	appropriately?
19	testing either by General Motors or by Mr.	19	MS. SMITH: Objection, form.
20	Smithers?	20	THE WITNESS: So I
21	MS. SMITH: Objection, form.	21	considered, you know, input from Dr.
22	THE WITNESS: I don't know	22	Wishart, but my analyses is based on
23	if he drafted those sections. He might	23	other PEMS testing that I've looked at,
24	have provided input on those sections,	24	documented papers about PEMS testing,
25	but I don't remember. I can't remember	25	information about West Virginia, how
	D 110		and the second s
	Page 119		Page 121
1	exactly if he added to those sections	1	the EPA uses PEMS testing, and how the
2	exactly if he added to those sections about GM's PEMS testing or not.	_	the EPA uses PEMS testing, and how the European Commission has used PEMS
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	Page 122	Page 124
1	from his reporting on what was	1 can glean from the produced materials
2	conducted at the scene during the	2 in Mr. Smithers' data.
3	testing or during the inspection and	
4	feedback that he had gleaned from	
5	looking at different PEMS testing	
6	protocols.	
7	BY MR. WOJTANOWICZ:	
8	Q. Did you conduct any dynamometer	
9	tests on any Cruze diesel vehicles for the	
10	purposes of your analysis here?	
11	A. I did not.	
12	Q. Did anyone working under your	
13	direction perform any dynamometer tests on	
14	Cruze vehicles for this case?	
15	A. No, they did not.	
16	Q. Do you know are you aware of any	
17	third party or any dynamometer tests on Cruze	
18	vehicles being performed for purposes of this	
19	case other than any one that may have been	
20	performed by you or actually someone else at	
21	Exponent?	
22	MS. SMITH: Objection, form.	
23	THE WITNESS: Sorry, am I	
1/1	aware of anybody else who has done don	
24	aware of anybody else who has done dyn testing?	
25	testing?	
25	testing?	Page 125
25	testing?  Page 123  BY MR. WOJTANOWICZ:	Page 125
25 1 2	testing?  Page 123  BY MR. WOJTANOWICZ:  Q. Correct, on the Cruze vehicles at	Page 125
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32 (Pages 122 - 125)

I realized, you know, kind of the

the vehicles he tested, I didn't see

issues with Mr. Smithers' methodology,

how the dyno testing would have added

much more to the information than that

already had and to the opinions that I

20

21

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23

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25

	D 124		D 120
1	Page 134 BY MR. WOJTANOWICZ:	1	Page 136 BY MR. WOJTANOWICZ:
2	Q. And I want to call your attention	2	Q. Going back, we were discussing your
3	back to a statement that you made earlier and	3	background, if any, in computer programming,
4	tell me if I'm summarizing this correctly. I	4	computer science, kind of when we went to break
5	believe that you said that in the testing data	5	there, so let me just ask you again, you don't
6	that you received from regarding Mr.	6	have any degrees in computer programming or
7	Smithers' PEMS tests that you do not have zero	7	computer science, do you?
8	and span data for the test segments that he	8	A. I do not have degrees in those
9	ran. Was that what you testified?	9	areas.
10	A. His report didn't mention how he	10	Q. Have you had any training in
11	did his calibration data, was it on span gas	11	computer science or computer programming?
12	data. There was some information in the Excel	12	A. As part of my undergraduate and
13	files. Some of it was missing. Some of it was	13	graduate study, we had to do computer
14	there. We tried to understand that, but we	14	programming. And in my graduate program, we
15	couldn't come up with anything conclusive, but	15	had to look at engine controls and evaluate
16	my statement was related to what was defined in	16	vehicles on dynos and look at engine controls
17	his report.	17	and how sensor inputs were used for vehicle
18	Q. So you're aware his report did	18	control.
19	indicate that they regularly calibrated the	19	Q. So is it fair to say that the
20	PEMS equipment during the course of their	20	computer science or computer programming
21	testing campaign. Do you recall that?	21	classes you had as an undergraduate were sort
22	A. He mentioned that he calibrated it,	22	of supplemental to or in conjunction with your
23	but didn't expand on what was done.	23	general engineering classwork, it wasn't a
24	Q. And the test data files that were	24	specified emphasis in computer science?
25	provided to you by counsel for General Motors,	25	A. So, yeah, I don't have a degree in
9	Page 135		Page 137
1			rage 137
1	those included data using the zero and span	1	computer science. My work in computer science
1 2		1 2	
	those included data using the zero and span		computer science. My work in computer science
2	those included data using the zero and span testing for every test segment, didn't it?	2	computer science. My work in computer science is related to the vehicle level control and
2 3	those included data using the zero and span testing for every test segment, didn't it? A. There was some missing data in one	2	computer science. My work in computer science is related to the vehicle level control and some of my work with calibrations and then loading calibrations on vehicles, and the applied use of control theory for mechanical
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THE WINNESS: Yes, that's my recollection  BYMR. WOTANOWICZ  Q. What about David Anderson, is he also a computer scientist?  A. I beheve he's a mechanical engineer that spent quite a bit a time with controls for engines and after-treatment systems.  Q. So is it fair to say that Dave A. At my direction and with my input, we reviewed it. They did some deeper dives when I asked for some additional information to be gleaned from Dr. Levchenko's report.  Q. And how did they convey from what they famely to your consulting work or expert vertices, whether it was the drafted it up or drafted up the  Page 139  Deservations for the report. Q. Did they summarize their findings for you in any way other than putting it in a draft report? Q. Did they summarize their findings for you in any way other than putting it in a draft report? M. SMITH: Objection—I my form. M. S. MITH: Sos it was all done from.  M. S. MITH: Sos it was all my direction and with my input, I did rely on some of their findings and they form.  M. S. MITH: Just objection, form.  THE WITNESS: So it was at my direction and with my input, I did rely on some of their findings and they direction and with my input, I did rely on some of their findings and they work with they shad done and wakked through the findings with them and did some of my own review of Dr. Levchenko's report.  BY MR. WOITANOWICZ:  4 A. Thus and I will go through, your for your whey in your what the findings work in the work in the most up-to-date version of the CV that you have?  A. A. Ckay. I'm there.  Q. Okay. First of all, is your CV, is this the most up-to-date version of the CV that you have?  A. Yes.  11 Q. And is everything accurate in here to the best of your knowledge?  A. Yes.  12 A. Yes.  13 A. Yes.  14 A. Yes.  15 A. So I'm a principal at Exponent. My riving?  16 be pleaned from Dr. Levchenko's report.  27 A. That is correct.  A. So I'm a principal at Exponent. My row only in the able to help them from a consulting whether it's engines and controls, advanced driver-assistance sys			940	AND THE PROPERTY OF THE PARTY O
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7	D	ĥ	7
1	Page 142 side?	1	Page 144  A. They would be more in the tech
2	Q. On the consulting side.	2	sector, I would call it.
3	A. So of that 50 percent, I would say	3	Q. Are these generally companies who
4	a third to half of that relates to gasoline	4	might manufacture components for vehicles, but
5	vehicles, engines.	5	not an entire vehicle?
6	Q. No, I'm specifically asking	6	A. I would say that's a fair
7	regarding gasoline vehicles, and maybe you said	7	generalization.
8	this and I misheard you, gasoline vehicle	8	Q. Is it fair to say that they're all
9	emissions.	9	related to the automobile industry, even if
10	A. Oh, sorry. On the emissions side,	10	they're not manufacturers, per se?
11	there's some attributes of what I do that's	11	MS. SMITH: Object to form.
12	related to emissions, it's not the primary	12	THE WITNESS: I would have
13	piece, so I would say a smaller fraction of	13	to go back and look for sure to see if
14	that 50 percent is related to gasoline vehicle	14	I'm missing something, but I think
15	emissions.	15	that's a correct assessment.
16	Q. And is that because a portion of	16	BY MR. WOJTANOWICZ:
17	your work relates to fuel economy and there is	17	Q. And of the roughly 50 percent of
18	some cross, sort of some relationship between	18	your work at Exponent that has been related to
19	fuel economy and emissions?	19	litigation-related work, what percentage of
20	A. Yeah, and a gasoline engine	20	that litigation-related work relates to diesel
21	performance kind of in general, yes.	21	vehicle emissions?
22	Q. So while some of your consulting	22	A. I would say, like, a third to maybe
23	work may bear on issues that relate to	23	half, somewhere in there, it's kind of, it's
24	emissions, none of it really is focused	24	hard to say because it fluctuates, but I would
25	specifically on measuring or controlling	25	say a third to half is related to diesel
-	-Promissing or common		
	D 142		D 145
1	Page 143	1	Page 145
1	emissions in gasoline vehicles; is that a fair	1 2	emissions.
2	emissions in gasoline vehicles; is that a fair statement?	2	emissions.  Q. And what percentage relates to fuel
3	emissions in gasoline vehicles; is that a fair statement?  A. I think that's a fair statement.	2.222	emissions.  Q. And what percentage relates to fuel economy issues, if any?
3 4	emissions in gasoline vehicles; is that a fair statement?  A. I think that's a fair statement.  Q. So does that kind of and to the	2 3	emissions.  Q. And what percentage relates to fuel economy issues, if any?  A. I would say 10, 15 percent,
2 3 4 5	emissions in gasoline vehicles; is that a fair statement?  A. I think that's a fair statement.  Q. So does that kind of and to the extent that we haven't what are the subject	2 3 4	emissions.  Q. And what percentage relates to fuel economy issues, if any?  A. I would say 10, 15 percent, somewhere in there.
3 4	emissions in gasoline vehicles; is that a fair statement?  A. I think that's a fair statement.  Q. So does that kind of and to the extent that we haven't what are the subject matters that make up the bulk of your	2 3 4 5	emissions.  Q. And what percentage relates to fuel economy issues, if any?  A. I would say 10, 15 percent, somewhere in there.  Q. And is there can you summarize
2 3 4 5 6 7	emissions in gasoline vehicles; is that a fair statement?  A. I think that's a fair statement.  Q. So does that kind of and to the extent that we haven't what are the subject	2 3 4 5 6 7	emissions.  Q. And what percentage relates to fuel economy issues, if any?  A. I would say 10, 15 percent, somewhere in there.  Q. And is there can you summarize for me what the remaining, you know, whatever
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	emissions in gasoline vehicles; is that a fair statement?  A. I think that's a fair statement.  Q. So does that kind of and to the extent that we haven't what are the subject matters that make up the bulk of your consulting work at Exponent since you have been there?  A. So kind of fuel economy, government regulatory analyses, engine failures, recalls, and consulting related to advanced driver-assisted systems or automated vehicles.  Q. And what percentage of your consulting work is done for automobile manufacturers, if you can generalize?  A. I would say of that consulting work, 75 percent is for automotive manufacturers.  Q. Is GM among the companies that has retained you for consulting work?  A. No.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	emissions.  Q. And what percentage relates to fuel economy issues, if any?  A. I would say 10, 15 percent, somewhere in there.  Q. And is there can you summarize for me what the remaining, you know, whatever 35 to 40 or 50 percent of your time spent on litigation-related matters, what the subject matters are?  A. Yeah, so it would be failures of components in gasoline engines, failure to recalls related to transmissions, then kind of broadly some of the more emerging technologies, like advanced driver-assistance systems vehicles or automated vehicles.  Q. Is it fair to say that all of the work that you've done on the litigation side is representing defendants in automobile-related litigation?  MS. SMITH: Objection, form.
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621	Page 158	920	Page 160
1	worse than the fuel economy listed. There was	1	factor needed to be corrected or
2	an offset, I think, around 10 percent that on	2	adjusted.
3	average, even though EPA and DOT got closer, it	3	BY MR. WOJTANOWICZ:
4	wasn't always a perfect match that there was	4	Q. Okay. It sounds like you were
5	typically a 10 percent offset and that was due	5	describing to me what the EPA had done to
6	to things like wind resistance, maintenance on	6	analyze those factors, but I'm asking whether
7	the vehicle that couldn't be captured	7	you specifically conducted any analyses related
8	completely on cycle.	8	to identifying the reason for the discrepancy
9	Q. During the course of your analysis	9	between dynamometer testing results and
10	of the dynamometer testing results submitted in	10	real-world results relating to CAFE standards?
11	connection with your work on the CAFE	11	MS. SMITH: Objection, form.
12	standards, did you ever identify any	12	THE WITNESS: So my work was
13	dynamometer testing results submitted by an OEM	13	with the EPA, I didn't conduct specific
14	that you believed were false or inaccurate?	14	testings or specific analyses at that
15	MS. SMITH: Objection, form.	15	point trying to pinpoint the exact
16	THE WITNESS: No.	16	differences, no.
17	Typically, the data I saw was at a	17	BY MR. WOJTANOWICZ:
18	higher kind of aggregate level and I	18	Q. Okay. Did you at any point?
19	didn't see anything where there was	19	A. I think I worked with our economist
20	you know, it was more at the aggregate	20	who looked at kind of it has been a long
21	level.	21	time since I've had to think about this or do
22	BY MR. WOJTANOWICZ:	22	anything with it. There was some, like,
23	Q. Did you do an analysis to determine	23	household survey studies that had information
24	why there historically had been a significant	24	about fuel economy that we had to look at as it
25	difference between the reported fuel economy	25	related to some of the work the EPA had done,
	Page 159		Page 161
1	for purposes of compliance with CAFE standards	1	but I can't remember the specifics offhand.
2	and the actual on-road fuel economy experienced	2	Q. In your position as senior engineer
3	by consumers?	3	at the Department of Transportation, did you
4	A. You said I guess if you could	4	have any responsibility for on-road testing to
5	read the question back, the first part, the	5	assess the real-world performance of fuel
6	specific nature of it.	6	economy for vehicles?
7	MR. WOJTANOWICZ: Sure.	7	MS. SMITH: Objection, form.
8	Would the reporter please read it back?	8	THE WITNESS: Actual vehicle
9	5.7.7.7	9	testing, no. I had led some work with
10	(Whereupon, the reporter read back	10	Argonne National Labs who was doing
11	as requested.)	11	some simulation work on you know,
12		12	part of the reason it's hard to
			part of the reason it's hard to
13	THE WITNESS: So, again,	13	evaluate technology is that they don't
13 14	THE WITNESS: So, again, that was at the higher level of looking	100	
		13	evaluate technology is that they don't
14	that was at the higher level of looking	13 14	evaluate technology is that they don't exist, so there isn't dyno work or
14 15	that was at the higher level of looking at what were some of the conditions	13 14 15	evaluate technology is that they don't exist, so there isn't dyno work or on-road data, so the DOT contracted
14 15 16	that was at the higher level of looking at what were some of the conditions that were outside of the test procedure	13 14 15 16	evaluate technology is that they don't exist, so there isn't dyno work or on-road data, so the DOT contracted with Argonne National Labs to do some
14 15 16 17	that was at the higher level of looking at what were some of the conditions that were outside of the test procedure that could be could influence fuel	13 14 15 16 17	evaluate technology is that they don't exist, so there isn't dyno work or on-road data, so the DOT contracted with Argonne National Labs to do some testing and some of that was testing
14 15 16 17 18	that was at the higher level of looking at what were some of the conditions that were outside of the test procedure that could be could influence fuel economy in the real world, so there was	13 14 15 16 17 18	evaluate technology is that they don't exist, so there isn't dyno work or on-road data, so the DOT contracted with Argonne National Labs to do some testing and some of that was testing for on-cycle testing, but there was
14 15 16 17 18 19	that was at the higher level of looking at what were some of the conditions that were outside of the test procedure that could be could influence fuel economy in the real world, so there was some, you know, kind of the broader	13 14 15 16 17 18 19	evaluate technology is that they don't exist, so there isn't dyno work or on-road data, so the DOT contracted with Argonne National Labs to do some testing and some of that was testing for on-cycle testing, but there was some testing about kind of off-cycle
14 15 16 17 18 19 20	that was at the higher level of looking at what were some of the conditions that were outside of the test procedure that could be could influence fuel economy in the real world, so there was some, you know, kind of the broader studies about environmental conditions,	13 14 15 16 17 18 19 20	evaluate technology is that they don't exist, so there isn't dyno work or on-road data, so the DOT contracted with Argonne National Labs to do some testing and some of that was testing for on-cycle testing, but there was some testing about kind of off-cycle testing as well to understand where
14 15 16 17 18 19 20 21	that was at the higher level of looking at what were some of the conditions that were outside of the test procedure that could be could influence fuel economy in the real world, so there was some, you know, kind of the broader studies about environmental conditions, hills, and things like that. There	13 14 15 16 17 18 19 20 21	evaluate technology is that they don't exist, so there isn't dyno work or on-road data, so the DOT contracted with Argonne National Labs to do some testing and some of that was testing for on-cycle testing, but there was some testing about kind of off-cycle testing as well to understand where there might be differences or gaps. So
14 15 16 17 18 19 20 21 22	that was at the higher level of looking at what were some of the conditions that were outside of the test procedure that could be could influence fuel economy in the real world, so there was some, you know, kind of the broader studies about environmental conditions, hills, and things like that. There wasn't a deep dive into the specific	13 14 15 16 17 18 19 20 21 22	evaluate technology is that they don't exist, so there isn't dyno work or on-road data, so the DOT contracted with Argonne National Labs to do some testing and some of that was testing for on-cycle testing, but there was some testing about kind of off-cycle testing as well to understand where there might be differences or gaps. So I would have led and informed some of

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1	Page 178 MR. WOJTANOWICZ: I was just	1	Page 180 publications, correct?
2	about to suggest that we take our lunch	2	Q. You know you're right, I slid over
3	break now, so.	3	into presentations. I apologize.
4	MS. SMITH: Perfect, and	4	A. No worries.
5	could you stay on for one second after	5	Q. Okay. Yeah. So the first one of
6	we go off the record to just discuss	6	those that you referenced, that is it says
7	some general scheduling?	7	"Corporate Average Fuel Economy Compliance and
8	MR. WOJTANOWICZ: Is that to	8	Effects Modeling System Documentation." Can
9	me or to	9	you describe for me what that publication is?
10	MS. SMITH: To everyone,	10	A. Sure. The work that I did on fuel
11	SOITY.	11	economy standards, in order for the DOT and
12	THE VIDEOGRAPHER: The time	The same of the sa	EPA to or the DOT specifically to promulgate
13	is 2:09. We're off the record.	13	fuel economy regulations, it has to evaluate
14	is 2.05. We le off the fecold.	14	the feasibility of technologies and the fuel
15	(A recess was taken at this time.)	15	economy standards. So, again, as I mentioned,
16	(A recess was taken at this time.)	16	my role was to look at the assumptions related
17	THE VIDEOGRAPHER: The time	422.00	to emerging fuel saving and CO2 reducing
18	is 2:53. We are on the record.	18	technologies and so that documentation was a
19	BY MR. WOJTANOWICZ:	19	separate piece of all the regulatory documents
20	Q. All right. Mr. Harrington, a few	20	
21	more questions about your CV here. Next, I	21	that I helped write, but I wasn't a named author, because they're federal documents, but
22	wanted to ask you about your publications,	22	
23	there are quite a few of them listed there. I	23	that report was how the modeling system worked,
24	don't want to belabor this by going through	24	the assumptions that were in it, and a lot of the assessments that I had made were documented
25	each of them. Can you tell me whether any of	The same of	The state of the s
23	each of them. Can you ten me whether any of	23	in that document as they relate to gasoline and
	Page 179		Page 181
1	these publications relate to emissions testing	1	diesel vehicle fuel economy and CO2 emissions
2	these publications relate to emissions testing for diesel vehicles?	2	diesel vehicle fuel economy and CO2 emissions and related technologies.
2	these publications relate to emissions testing for diesel vehicles?  A. So the third from the bottom, the	2	diesel vehicle fuel economy and CO2 emissions and related technologies.  Q. But that publication did not
2 3 4	these publications relate to emissions testing for diesel vehicles?  A. So the third from the bottom, the Corporate Average Fuel Economy effects	3 4	diesel vehicle fuel economy and CO2 emissions and related technologies.  Q. But that publication did not address the proper way to conduct PEMS testing,
2 3 4 5	these publications relate to emissions testing for diesel vehicles?  A. So the third from the bottom, the Corporate Average Fuel Economy effects modeling, so that deals with gasoline and	2 3 4 5	diesel vehicle fuel economy and CO2 emissions and related technologies.  Q. But that publication did not address the proper way to conduct PEMS testing, did it?
2 3 4 5 6	these publications relate to emissions testing for diesel vehicles?  A. So the third from the bottom, the Corporate Average Fuel Economy effects modeling, so that deals with gasoline and diesel vehicle, fuel economy and CO2 emissions.	2 3 4 5 6	diesel vehicle fuel economy and CO2 emissions and related technologies.  Q. But that publication did not address the proper way to conduct PEMS testing, did it?  A. There was not a discussion of PEMS
2 3 4 5 6 7	for diesel vehicles?  A. So the third from the bottom, the Corporate Average Fuel Economy effects modeling, so that deals with gasoline and diesel vehicle, fuel economy and CO2 emissions. It's not specific to diesel vehicle emissions	2 3 4 5 6 7	diesel vehicle fuel economy and CO2 emissions and related technologies.  Q. But that publication did not address the proper way to conduct PEMS testing, did it?  A. There was not a discussion of PEMS testing that I can recall in that document.
2 3 4 5 6 7 8	these publications relate to emissions testing for diesel vehicles?  A. So the third from the bottom, the Corporate Average Fuel Economy effects modeling, so that deals with gasoline and diesel vehicle, fuel economy and CO2 emissions. It's not specific to diesel vehicle emissions testing, but it relates to diesel vehicle, CO2	2 3 4 5 6 7 8	diesel vehicle fuel economy and CO2 emissions and related technologies.  Q. But that publication did not address the proper way to conduct PEMS testing, did it?  A. There was not a discussion of PEMS testing that I can recall in that document.  Q. And that publication did not
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	Page 182	20	Page 184
1	economy, that delta between what was tested and	1	you spoken where you weren't invited to speak?
2	versus kind of the average on-road fuel economy	2	A. I can't recall which ones I
3	performance of vehicles out in the fleet.	3	wasn't usually, I'm invited to speak. I
4	Q. And then the next stated	4	think there was a few where I offered to speak,
5	publication, it looks like it has essentially	5	but typically, I get invited to speak at
6	the same title "Corporate Average Fuel Economy	6	different conferences or different topic areas.
7	Compliance and Effects Modeling System	7	Q. Are any of the do you know
8	Documentation." Was that publication related	8	whether any of the presentations that you have
10	to the prior one that we just discussed?	9	not listed where you offered to speak, did any of them relate to diesel vehicle emissions?
11	A. So they're, in essence, you know,	10 11	en autoria de la circa de la companione de
12	the same or similar document, the one you just mentioned was for the 2012 through 2016 model	12	A. I guess the presentations that might not have been on there, when I was at
13	year rule and the first one that you had stated	13	Cummins, I think I mentioned this before, I had
14	was the 2017 to 2025 model year rule, so the	14	to go out and work with fleets about upcoming
15	same document, but for two different documents	15	changes to the vehicles due to regulations, so
16	rule makings and time periods.	16	I had to present on those topics to some of our
17	Q. What was your role in and there	17	clients and customers. So those probably were
18	was some coauthors that you had with both of	18	not listed on here, talking to some fleets or
19	those publications, correct?	19	potential customers of Cummins engines, so that
20	A. Correct.	20	related to heavy-duty vehicles and engines.
21	Q. What was your role with respect to	21	Q. Any other presentations that are
22	drafting those publications?	22	not listed here that relate to diesel vehicle
23	A. So I drafted the sections that were	23	emissions?
24	related to the technology assumptions that went	24	A. Internally to the DOT and EPA, I
25	into the model and how we addressed the fleet	25	gave quite a few presentations to senior
	Seaton page the development of the control of the c		
1	Page 183 of vehicles that were used to model an overall	1	Page 185 officials, White House staff, as relates to
2	fleet of vehicles going forward.	2	fuel economy standards and greenhouse gas
3	Q. Any other parts that you drafted?	3	emissions, which include diesel vehicles and
4	A. It has been a while since I looked	4	technology. And it looks like the National
5	at those. Those are the two main parts that I	5	Academy of Sciences Committee Meeting is on
6	would have been responsible for. I might have		here, so that one is actually listed that's the
7	provided input to some other sections, but I	7	third from the bottom under presentations.
8	can't think of them right now.	8	Q. Okay. Have you given any
9	Q. And other than those two that you	9	presentations that relate to any diesel vehicle
10	just identified, none of the other publications	10	emissions cheating allegations?
11	listed here relate to emissions compliance	11	A. No.
12	testing in any way, correct?	12	Q. Have you given any presentations
13	A. That is correct.	13	that relate to PEMS testing or how to conduct
14	Q. Your CV also lists a number of	14	PEMS testing?
15	presentations. It says "Selected Invited	15	A. Not that I can recall.
16	Presentations," does that mean you've given	16	Q. Have you given any presentations
17	more presentations than the ones that you have	17	regarding the proper way to conduct a
18	listed here?	18	dynamometer testing?
19	A. Yeah, there was some other where	19	A. Not that I can recall, no.
20	I wasn't invited to speak, it was kind of	20	Q. There's a presentation listed at
		21	the bottom of page 3 of your CV, the very
21	lesser roles, and I couldn't remember all of	21	- [ TGG ( CO) 전 [ 전 ( CO) 전 ( CO) 전 ( CO) 로봇 ( CO) (
21 22	them, so these are the main ones where I was	22	bottom is where it starts "The Future of
1000	는 사람들이 하나 있다면 가는 경우 사람들이 바꾸어야 한다면 하나 있습니다. 이번 경우 보다는 사람들이 있는 사람들이 되었다면 하는 사람들이 없는 사람들이 없는 사람들이 없는 사람들이 없다면 하는 사람들이 없다면 하는 것이다.		
22	them, so these are the main ones where I was	22	bottom is where it starts "The Future of

	D 200	1	B 200
1	Page 306 well.	1	Page 308 referring to a specific page of this or
2	Q. There's also some time components	2	are you just asking him that?
	there that you need to have achieved a	3	MR. WOJTANOWICZ: I'm just
	prescribed speed within a certain period of	4	asking him.
	time, like a deadline within the testing	5	MS. SMITH: Okay. Are you
2.50	period; is that right?	6	sure you're saying it right?
7	A. So it's part of that plus or minus	7	THE WITNESS: Is there a
8	2-mile-an-hour curve, yeah, you have to follow,	8	I'm not remembering seeing something
9	you have to follow that trace and if you,	9	like that, but I'm not sure. Is there
10	obviously, are lagging or ahead in speed, you	10	a document that that's in?
11	won't complete the test in the right time	11	BY MR. WOJTANOWICZ:
12	period.	12	Q. No, I'm asking if you are familiar
13	Q. So there's some leeway for a driver	13	with that calculation, apparently, the answer
14	to have an influence on the outcome of an	14	to that is no. You're not familiar with the VA
15	emissions test on a dynamometer by either being	15	POS at 95 calculation?
	a little bit higher or a little bit lower on	16	MS. SMITH: Objection, form.
	speed and a little bit earlier or a little bit	17	Objection, you are not showing the
	late on time, as long as they can stay within	18	document. I'm not sure the way you're
	the acceptable parameters, correct?	19	even describing the signs is something
20	MS. SMITH: Objection, form.	20	that's comprehensible. So objection.
21	THE WITNESS: There is some,	21	THE WITNESS: There's the
22	just like there is vehicle-to-vehicle	22	relative positive is it relative
23	variation, there's some	23	positive acceleration that you are
24	driver-to-driver variation, but the way	24	talking about? Hearing what you said,
25	the regulations and the tests are	25	I don't remember seeing that, that
	Page 307	_	Page 309
1	written, it tries to minimize that to a	1	metric or that number or equation that
2	quantity that's not, you know, overly	2	you're referencing. BY MR. WOJTANOWICZ:
3	influential in the overall results, but	3	BY MR. WOJIANOWICZ:
4	there is some variability there.		With the Control of t
-	DV MD WOLLANOWICZ	4	Q. Relative positive acceleration is
	BY MR. WOJTANOWICZ:	5	Q. Relative positive acceleration is something else, let me ask you this, did you
6	Q. And what kind of analysis of driver	5	Q. Relative positive acceleration is something else, let me ask you this, did you calculate the relative positive acceleration
6 7	Q. And what kind of analysis of driver aggressiveness did you do for purposes of	5 6 7	Q. Relative positive acceleration is something else, let me ask you this, did you calculate the relative positive acceleration for the CoC test results presented here?
6 7 8	Q. And what kind of analysis of driver aggressiveness did you do for purposes of determining whether you could rely on these CoC	5 6 7 8	Q. Relative positive acceleration is something else, let me ask you this, did you calculate the relative positive acceleration for the CoC test results presented here?  A. I don't remember calculating that,
6 7 8 9	Q. And what kind of analysis of driver aggressiveness did you do for purposes of determining whether you could rely on these CoC tests and figures here?	5 6 7 8 9	Q. Relative positive acceleration is something else, let me ask you this, did you calculate the relative positive acceleration for the CoC test results presented here?  A. I don't remember calculating that, no.
6 7 8 9	Q. And what kind of analysis of driver aggressiveness did you do for purposes of determining whether you could rely on these CoC tests and figures here?  MS. SMITH: Objection, form.	5 6 7 8 9	Q. Relative positive acceleration is something else, let me ask you this, did you calculate the relative positive acceleration for the CoC test results presented here?  A. I don't remember calculating that, no.  Q. Okay. The VA POS at 95 measurement
6 7 8 9 10 11	Q. And what kind of analysis of driver aggressiveness did you do for purposes of determining whether you could rely on these CoC tests and figures here?	5 6 7 8 9 10 11	Q. Relative positive acceleration is something else, let me ask you this, did you calculate the relative positive acceleration for the CoC test results presented here?  A. I don't remember calculating that, no.  Q. Okay. The VA POS at 95 measurement is defined sometimes as the 95th percentile of
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1	UNITED STATES DISTRICT COURT
	EASTERN DISTRICT OF MICHIGAN
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4	JASON COUNTS, DONALD KLEIN, C.A. NO.
	OSCAR ZANORA, DEREK LONG, 1:16-CV-12541-TLL-PTM
5	HASSAM HIRMIZ, JASON SILVEUS,
	JOHN MISKELLY, THOMAS HAYDUK,
6	CHRISTOPHER HEMBERGER and
	JOSHUA RODRIGUEZ, individually
7	and on behalf of all others similarly
	situated,
8	Plaintiffs,
9	·
	-against-
10	
11	GENERAL MOTORS LLC, ROBERT
	BOSCH GMBH, and ROBERT
12	BOSCH, LLC,
	Defendants.
13	
14	
	HIGHLY CONFIDENTIAL
15	
16	
17	VIRTUAL VIDEOTAPED DEPOSITION OF RYAN HARRINGTON
18	NATICK, MASSACHUSETTS
19	Thursday, July 23, 2020
20	
	VOLUME 2
21	
22	
23	REPORTED BY:
24	ROBIN CLARK, RPR, CLR
25	

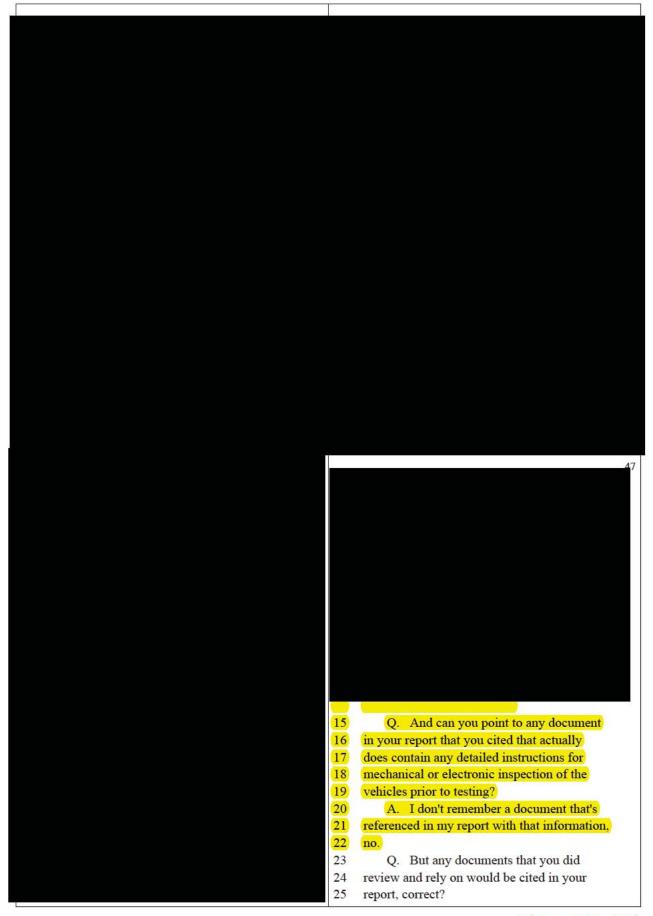
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Page 320  Virtual Videotaped Deposition of RYAN  HARRINGTON, taken by Plaintiffs, pursuant to notice, commencing at 10:12 a m., by and before Robin L.  Clark, Registered Professional Reporter and Notary  Public in and for the Commonwealth of Pennsylvania.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 23 24	REMOTE APPEARANCES, continued:  CLEARY GOTTLIEB STEEN & HAMILTON, LLP BY: DAVID BRODSKY, ESQ PATRICK SWIBER, ESQ RENEE GRIFFIN, ESQ 2000 Pennsylvania Avenue, N W Washington, D C 20006 202-947-1588 dbrodsky@cgsh com pswiber@cgsh com rgriffin@cgsh com For the Defendant Robert Bosch LLC  ALSO PRESENT REMOTELY: STEVEN HURVITZ, ESQ HOWARD BRODSKY, VIDEOGRAPHER JUSTON SMITHERS ALI KRAL, TECHNICIAN	Page 322
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1 1 2 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	REMOTE APPEARANCES:  HAGENS BERMAN SOBOL SHAPIRO, LLP BY: GARTH WOJTANOWICZ, ESQ STEVE BERMAN, ESQ JESSICA THOMPSON, ESQ 1301 Second Avenue, Suite 2000 Seattle, Washington 98101 206-623-7292 garthw@hbsslaw com jthompson@hbsslaw com jthompson@hbsslaw com jthompson@hbsslaw com jthompson@hbsslaw com For the Plaintiffs  CARELLA, BYRNE, CECCHI, OLSTEIN, BRODY & AGNELLO, P C BY: JAMES E CECCHI, ESQ ZACHARY BOWER, ESQ 5 Becker Farm Road Roseland, New Jersey 07068 973-997-1700 jcecchi@carellabyrne com zbower@carellabyrne com zbower@carellabyre com For the Plaintiffs  SEEGER WEISS, LLP BY: SHAUNA ITRI, ESQ 1515 Market Street, Suite 1380 Philadelphia, Pennsylvania 19102 215-564-2300 sitri@seegerweiss com For the Plaintiffs  KIRKLAND & ELLIS, LLP BY: RENEE D SMITH, ESQ KATE WARNER, ESQ 300 North LaSalle Chicago, Illinois 60654 312-862-2000 rdsmith@kirkland com For the Defendant General Motors LLC	1 2 3 4 5 6 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	INDEX WITNESS PAGE RYAN HARRINGTON BY MR WOJTANOWICZ: 327, 676 BY MS SMITH: 649  EXHIBITS NUMBER DESCRIPTION MARKED Harrington Exhibit 5 Dyno HP Coefficient 333 Determination Bates GMCOUNTS000852163 to 852211 Exhibit 6 Privately-Owned Vehicle 341 Work Order Bates GMCOUNTS000852050 Exhibit 7 Privately-Owned Vehicle 346 Work Order Bates GMCOUNTS000851986 to 851987 Exhibit 8 Driver's Checklist Bates 346 GMCOUNTS000852149 to 852150  Exhibit 9 Calculator Document Bates 362 GMCOUNTS000852229 Exhibit 10 HWFET Chart 373 Exhibit 11 Email dated 5/16/19 Bates 400 GMCOUNTS000852424  Exhibit 12 Email String Bates 407 GMCOUNTS000852421 TO 852422 Exhibit 13 07_GM Diesel PEMS 428 Evaluation - MY14 Cruze Bates GMCOUNTS000379567 to 379574  Exhibit 14 Deposition of Sarah Funk 449  Exhibit 15 Chevrolet Cruze Diesel 467	Page 323

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Q. Did you conduct any additional 25 these test results in your report.	23	there was a few notes in here, but I wasn't		
· ·	23 24	there was a few notes in here, but I wasn't able to find a lot of information on that.	24	to being tested for purposes of relying on

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	Page 340		Page 342
1	MS. SMITH: Objection, form,	1	MS. SMITH: We still just
2	compound. Asked and answered.	2	don't have the folder, so if people
3	THE WITNESS: So, again, my	3	could email it again. Oh, I got it.
4	focus is on Mr. Smithers' testing. You	4	Thank you.
5	know, I compared these results as part	5	THE TECHNICIAN: You have
6	of my consideration, but my opinions	6	the folder now, Renee?
7	are based on the procedures that he had	7	MS. SMITH: No, I have the
8	done on the vehicle that he had that	8	email.
9	showed above the limit with no	9	MR. BRODSKY: This doesn't
10	additional analyses on his part to	10	need to be on the record.
11	understand why his vehicle was not	11	ACCUMENTATION OF THE SECOND
12	compliant.	12	(Discussion was held off the record.)
13	BY MR. WOJTANOWICZ:	13	
14	Q. Mr. Harrington, that answer was not	14	MS. SMITH: Why don't we do
15	responsive to my question. I'm going to ask	15	this off the record? For now, let's
16	you again to respond to the question I'm	16	just do the email and then we can play
17	actually asking you, which is, before you put	17	around with this. Thank you.
18	in your report a summary and relied upon the	18	MR. WOJTANOWICZ: Okay. It
19	test results from this in-use testing, did you	19	appears that my ability to introduce
20	feel it was important to understand how the	20	them online is still not back up.
21	vehicles were inspected for mechanical problems	21	THE TECHNICIAN: I can do
22	prior to there being tested?	22	so. Let me do that for you, please.
23	MS. SMITH: Objection, form.	23	It's number six as introduced as
24	Objection, asked and answered.	24	it's number five introduced as number
25	THE WITNESS: I looked at	25	six, correct?
	Page 341	li .	Page 343
	Fage 341		rage 343
1	the data that I had to see what was	1	MR. WOJTANOWICZ: Correct.
2		1 2	
2 3	the data that I had to see what was there and reviewed the information that was there, but I did not ask for	20.000	MR. WOJTANOWICZ: Correct.
2 3 4	the data that I had to see what was there and reviewed the information that was there, but I did not ask for additional information.	20.000	MR. WOJTANOWICZ: Correct.
2 3 4 5	the data that I had to see what was there and reviewed the information that was there, but I did not ask for additional information. BY MR. WOJTANOWICZ:	20.000	MR. WOJTANOWICZ: Correct.
2 3 4 5 6	the data that I had to see what was there and reviewed the information that was there, but I did not ask for additional information.  BY MR. WOJTANOWICZ: Q. Okay. I'm going to introduce	20.000	MR. WOJTANOWICZ: Correct.
2 3 4 5 6 7	the data that I had to see what was there and reviewed the information that was there, but I did not ask for additional information.  BY MR. WOJTANOWICZ: Q. Okay. I'm going to introduce another exhibit now, I guess I can try to do it	20.000	MR. WOJTANOWICZ: Correct.
2 3 4 5 6	the data that I had to see what was there and reviewed the information that was there, but I did not ask for additional information.  BY MR. WOJTANOWICZ: Q. Okay. I'm going to introduce another exhibit now, I guess I can try to do it electronically, but at the same time if my	20.000	MR. WOJTANOWICZ: Correct.
2 3 4 5 6 7 8 9	the data that I had to see what was there and reviewed the information that was there, but I did not ask for additional information.  BY MR. WOJTANOWICZ: Q. Okay. I'm going to introduce another exhibit now, I guess I can try to do it electronically, but at the same time if my colleagues could email it for me, please, it's	20.000	MR. WOJTANOWICZ: Correct.
2 3 4 5 6 7 8 9 10	the data that I had to see what was there and reviewed the information that was there, but I did not ask for additional information.  BY MR. WOJTANOWICZ: Q. Okay. I'm going to introduce another exhibit now, I guess I can try to do it electronically, but at the same time if my colleagues could email it for me, please, it's going to be tab number five in my private	20.000	MR. WOJTANOWICZ: Correct.
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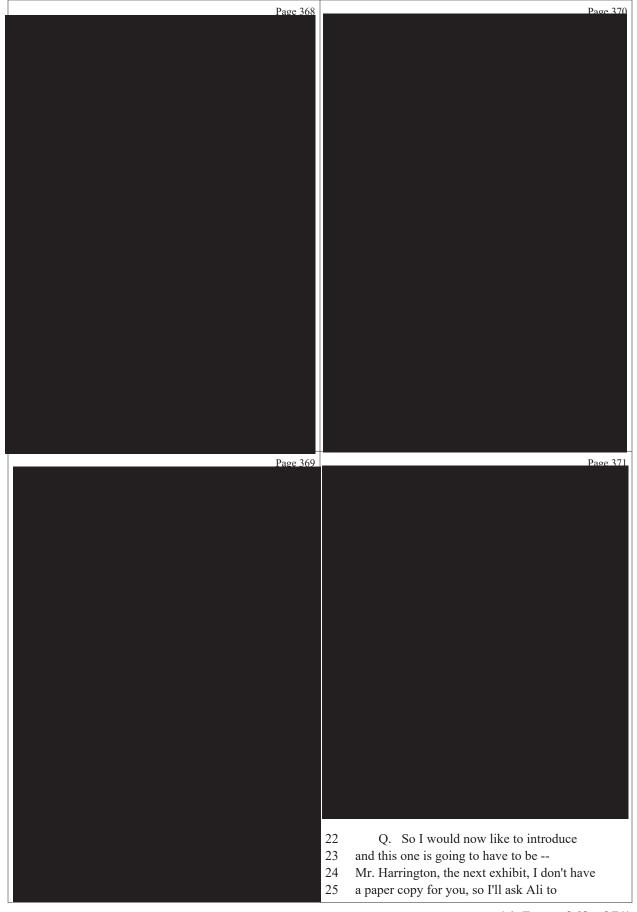
7 (Pages 340 - 343)



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13    MR. WOJTANOWICZ: Yes.   THE WITNESS: Okay. I have	2000		100000	
14 MR. WOJTANOWICZ: Yes. 15 THE WITNESS: Okay. I have 16 found that document. 17 MS. SMITH: Got it. Thank 18 you, sorry. 19 BY MR. WOJTANOWICZ: 20 Q. All right. So on page, are you at 21 page 198? 22 A. Let me get to 198. Okay. 23 Q. Do you see there in the middle of 24 the page it says "Truck Driver Monitoring 25 Report"?  1 A. Yes. 2 Q. And this particular report relates 3 to the HWFET, correct? 4 A. That's my understanding, yes. 5 Q. And then it says the limits are 6 plus or minus 2 miles per hour, 1.0 seconds; is 1 the leeway allowed for a driver operating the 1 HWEET test is to stay within 2 miles per hour 2 of the prescribed speed and to achieve those 3 speeds within one second of the prescribed time 4 at which those speeds should be achieved? 4 A. That's my understanding. 5 Q. So is it your understanding that 6 plus or minus 2 miles per hour, 1.0 seconds; is 10 the leeway allowed for a driver operating the 11 HWEET test is to stay within 2 miles per hour 12 of the prescribed speed and to achieve those 13 speeds within one second of the prescribed time 14 at which those speeds should be achieved? 15 A. That's my understanding. 16 Q. And it says the me were no 17 violations during this test, right? 18 A. Correct. 19 Q. Did you have access to the 19 underlying test data for the HWFET and FTP-75 10 tests that were run on these in-use testing 10 vehicles? 21 A. I did not look at them. They may 22 have been there, but I don't remember analyzing 23 A. I did not look at them. They may 24 have been there, but I don't remember analyzing 25 Imate the RPA for these tests. 26 Q. Nor did you calculate the VA 27 Q. Nor did you calculate the VA 28 Q. Nor did you calculate the VA 29 Q. That's correct 20 Q. Do you review the QA/QC data for 22 Can. I don't remember going back to the 23 QA/QC data? 24 Q. Explain for the record, if you 25 would, what is QA/QC data? 26 A. It don't remember looking through 27 the remaintenance results for these vehicles were 28 plus or minus 2 miles per hour 29 Q. So is it your understanding t		MS. SMITH: Is it the one		
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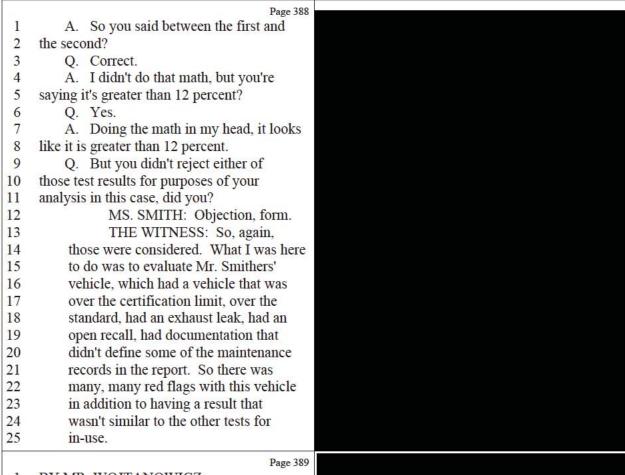
-		ĥ	
1	Page 360 BY MR. WOJTANOWICZ:	1	Page 362 see how frequently the DPF would regen
2	Q. Do you know whether GM inspected	2	and then there's a calculation that
3	any maintenance records for the vehicles that	3	
4	•		developed the upward adjustment factor and that's what has been added to the
5	it used for its in-use testing?  A. I don't have that information, no.	4	
-	The state of the s	5	first column to get that second column.
6	Q. So I would like you to turn back to	6	BY MR. WOJTANOWICZ:
150	Exhibit No. 1 in your report and the chart at	7	Q. Okay. At this point, I would like
8	page 17.	8	you to pull out tab number ten and I would like
9	A. Okay.	9	to introduce, if Ali would for me, please, and
10	Q. So you compiled this chart based on	10	or whoever sending emails for me, tab number
11	documents that you reviewed in this case,	11	ten, which will be an Exhibit
12	correct?	12	THE TECHNICIAN: It will be
13	A. Correct.	13	Exhibit No. 9. Your exhibit has been
14	Q. Those documents are cited in	14	introduced. Thank you.
15	footnotes down below?	15	70.1.1.
16	A. That is correct.	16	(Calculator Document Bates
17	Q. And basically it just identifies	17	GMCOUNTS000852229 marked Harrington
18	the vehicle by V.I.N. number and also by a sor		Exhibit 9 for identification.)
19	of identifying number that GM assigned to it	19	
20	for purposes of its test; is that right?	20	MR. WOJTANOWICZ: So wait a
21	A. That's my understanding of the	21	second for Renee and David to receive
22	numbers, yes.	22	see the email.
23	Q. It shows the date of the tests, the	23	MS. SMITH: Yeah, I don't
24	mileage that GM recorded for the vehicle, and	24	have it yet, but I'll yell as soon as
25	then it has a couple of results in the last two	25	it gets here.
			3
1	Page 361		Page 363
1	Page 361 columns, correct?	1	Page 363 MR. BRODSKY: I'm able to to
1 2		2	
20000	columns, correct?		MR. BRODSKY: I'm able to to pull it up on the screen. So I'm good, thanks.
2	columns, correct?  A. Correct.	2 3 4	MR. BRODSKY: I'm able to to pull it up on the screen. So I'm good,
2	columns, correct?  A. Correct. Q. Now, the first column shows FTP	2 3	MR. BRODSKY: I'm able to to pull it up on the screen. So I'm good, thanks.
2 3 4	columns, correct?  A. Correct.  Q. Now, the first column shows FTP well, let me back up. What this is summarizing	2 3 4 5 6	MR. BRODSKY: I'm able to to pull it up on the screen. So I'm good, thanks.  MS. SMITH: I received the email.  BY MR. WOJTANOWICZ:
2 3 4 5	columns, correct?  A. Correct.  Q. Now, the first column shows FTP well, let me back up. What this is summarizing are just the FTP-75 results that GM recorded	2 3 4 5	MR. BRODSKY: I'm able to to pull it up on the screen. So I'm good, thanks.  MS. SMITH: I received the email.
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2 3 4 5 6 7 8	columns, correct?  A. Correct.  Q. Now, the first column shows FTP well, let me back up. What this is summarizing are just the FTP-75 results that GM recorded for these vehicles, right?  A. That's correct.  Q. As we established earlier, you	2 3 4 5 6 7 8	MR. BRODSKY: I'm able to to pull it up on the screen. So I'm good, thanks.  MS. SMITH: I received the email.  BY MR. WOJTANOWICZ:  Q. Mr. Harrington, Exhibit No. 9, or maybe you're still looking for it?
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12 (Pages 360 - 363)



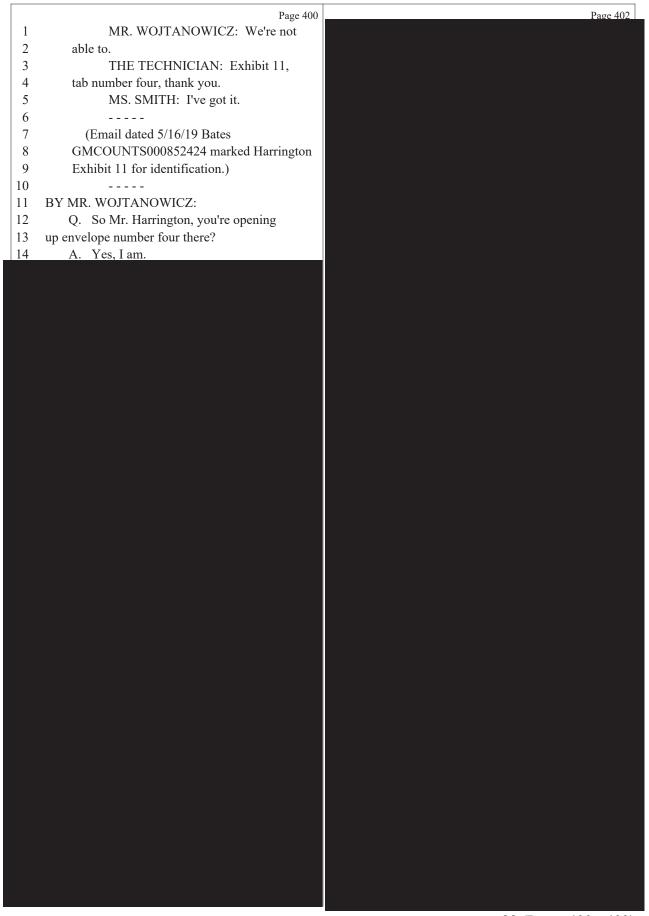
14 (Pages 368 - 371)

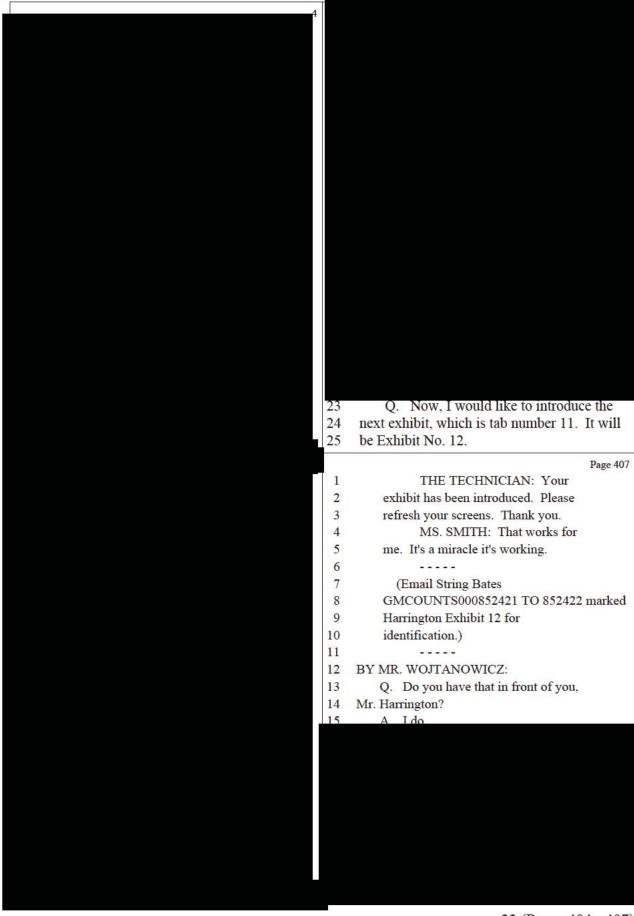
Page 380 Page 382 1 going to be removed by the emissions system of 1 out, it's going to be letting out everything 2 the diesel Cruze has done its work, correct? 2 that's in that exhaust, including NOx, correct? 3 3 A. Could you state that again? A. It could, yes. However, it's going Q. The leak that was identified came 4 to impact or could impact the NOx sensor 4 5 in a point in the emissions system that is 5 reading and impact how the vehicle is operating 6 after the FCR system, after the entire exhaust 6 and the vehicle's understanding of how much 7 treatment system has done its work and anything 7 tailpipe NOx is coming out in the SCR 8 that would pass that point is ultimately 8 efficiency. So it could impact the emissions 9 9 heading to the tailpipe, correct? system and the control system. 10 O. But you didn't do any analysis to 10 MS. SMITH: Objection, form. THE WITNESS: So a leak in see whether, A, whether the system was actually 11 11 12 sucking in any air at any given time, did you? 12 an exhaust after-treatment system can 13 suck air in and it can expel exhaust 13 A. Not during the inspection and I 14 didn't do an analyses, that's, you know, Mr. 14 out and then that NOx sensor also is 15 Smithers -- it's Mr. Smithers' testing, I 15 part of the feedback loop, it helps the emissions system understand how it's wasn't aware of the testing and didn't evaluate 16 16 17 performing from a NOx perspective, so 17 whether or not there was an impact of that leak there's potential impacts for how the on his results in the operation of that 18 18 19 19 system is operating and the exhaust vehicle. 20 that's measured -- or the exhaust 20 Q. Now, going back to -- do you recall 21 emissions that are measured at the 21 at page 56 of your report, if you would turn 22 tailpipe. 22 there, please, quickly. 23 23 BY MR. WOJTANOWICZ: A. Okay. 24 24 O. Move to strike that as Q. Actually, let me go back for a 25 second. Do you know in fact whether the leak 25 nonresponsive. I asked you a simple question. Page 381 Page 383 1 The leak that you identified came after the 1 in the emissions system that was detected 2 2 emissions control system in terms of the during the vehicle inspection in fact impacted 3 3 physical layout of the vehicle, correct? any test results? A. So it didn't come after the control 4 A. I don't have evidence of when that 4 5 5 system. It came at the last point in the exhaust leak occurred, so I can't determine the control system for the emissions system. 6 6 impact, but it's a -- having a known 7 7 Q. It was past the last NOx sensor, maintenance issue on a vehicle, you know, can 8 correct? 8 impact the operation of the vehicle and Mr. 9 It was at the last NOx sensor. 9 Smithers did not perform a leak test, so it's 10 Q. Now, what did you do to analyze 10 unclear when that leak test developed or when whether that leak was -- one of the things that that leak developed. 11 11 could happen with a leak developing at that 12 12 Q. And just to be clear, GM didn't point is that NOx and other emitants or other 13 perform any leak tests on its test vehicles for 13 14 14 exhaust could be leaking out of that, correct? purposes of in-use testing, did it? 15 A. So there's pulsation in the exhaust 15 A. They listened for leaks, so they after -- or exhaust system, so some exhaust can 16 16 did perform a leak test. Q. You don't know in fact whether Mr. 17 leave and other times air can come into the 17 Smithers or anyone else performing the PEMS 18 system. 18 19 19 testing or the dyno testing also listened for Q. If exhaust is leaving, then that's actually going to reduce the amount of tailpipe 20 20 leaks, do you? 21 NOx that's being measured either by a dyno 21 A. I don't -- there was no evidence 22 system or by a PEMS system, correct? 22 that the leak test was performed and I thought A. Right, it could impact that NOx 23 23 there was a discussion in Mr. Smithers' 24 reading. 24 deposition that he did not check for leak 25 Q. I mean, if it's letting exhaust 25 tests, but I can't remember exactly how that

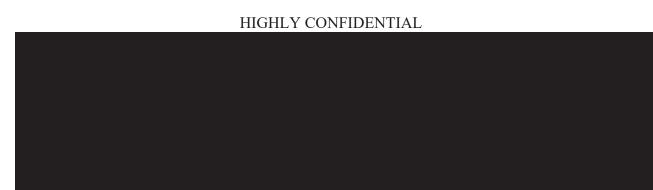


1 BY MR. WOJTANOWICZ:

_	Page 396		Page 3	398
		1	BY MR. WOJTANOWICZ:	
		2	Q. And you have attempted to be	
		3	reasonable and robust in rendering your	
		4	engineering opinions as outlined in your	
		5	report, haven't you?	
		6	A. I've tried to, yes.	
1				
15	Q. And it's not of concern to you if			
16	the vehicle achieves a score, a NOx value on			
17	the test, that is very near but not quite above			
18	the certification standard, that's not a			
19	concern to you, right?			
20	MS. SMITH: Objection, form.	20	Q. So you didn't feel the need to	
21	THE WITNESS: You know, it's	21	apply these same reasonable and robust	
22	reasonable to look at that, but it's	22	engineering standards to your own reliance on	
23	still, you know, underneath the	23	the test data cited in the summary table on	
24	standard and there's the standard is	24	page 17?	
25	there for a reason and it met that. It	25	MS. SMITH: Objection, form.	
				202
1	Page 397 met the standard.	1	Misstates his testimony.	399
		1	winstates his testimony.	
1	RV MR WOTTANOWICZ:	2	THE WITNESS: Again I	
2	BY MR. WOJTANOWICZ:  O Okay But you've drawn the line in	2	THE WITNESS: Again, I	
3	Q. Okay. But you've drawn the line in	3	considered these data, but my focus was	
3	Q. Okay. But you've drawn the line in anything above the certification standard, in	3	considered these data, but my focus was on Mr. Smithers' vehicle and the known	
3 4 5	Q. Okay. But you've drawn the line in anything above the certification standard, in your view, the results indicate some problem	3 4 5	considered these data, but my focus was on Mr. Smithers' vehicle and the known maintenance issues at the time of the	
3 4 5 6	Q. Okay. But you've drawn the line in anything above the certification standard, in your view, the results indicate some problem with the vehicle and you've got to discount	3	considered these data, but my focus was on Mr. Smithers' vehicle and the known maintenance issues at the time of the inspection.	
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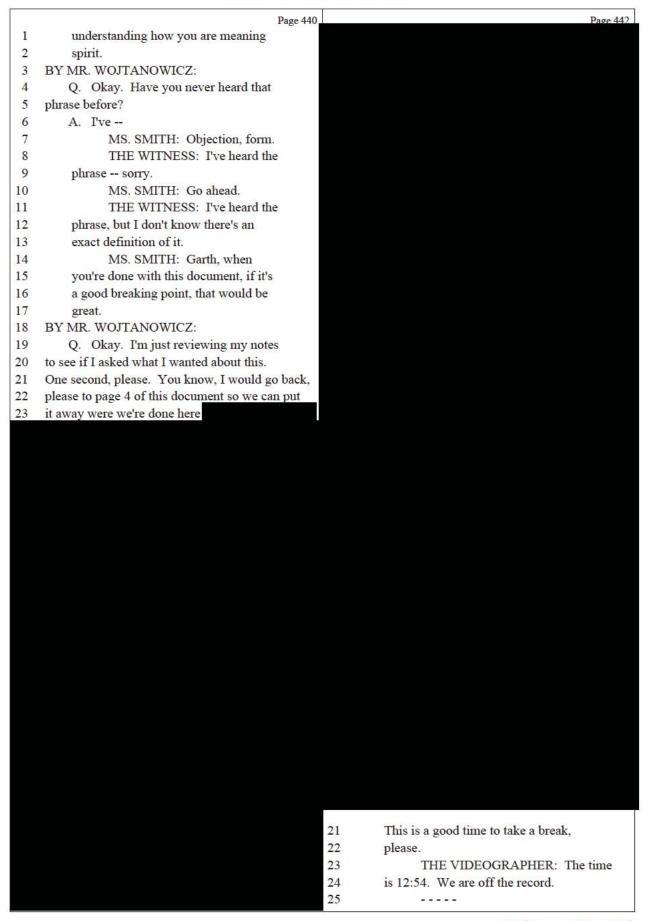


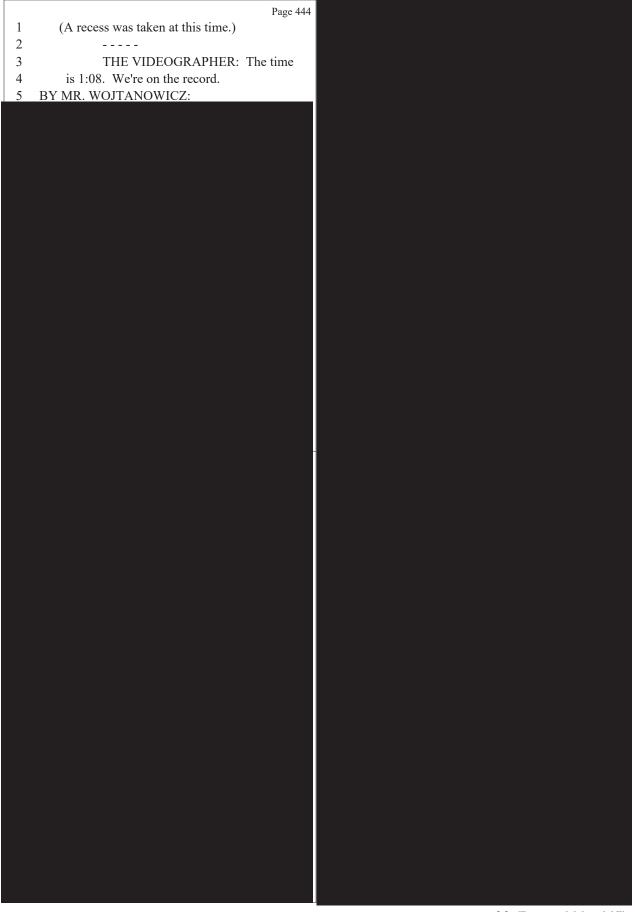




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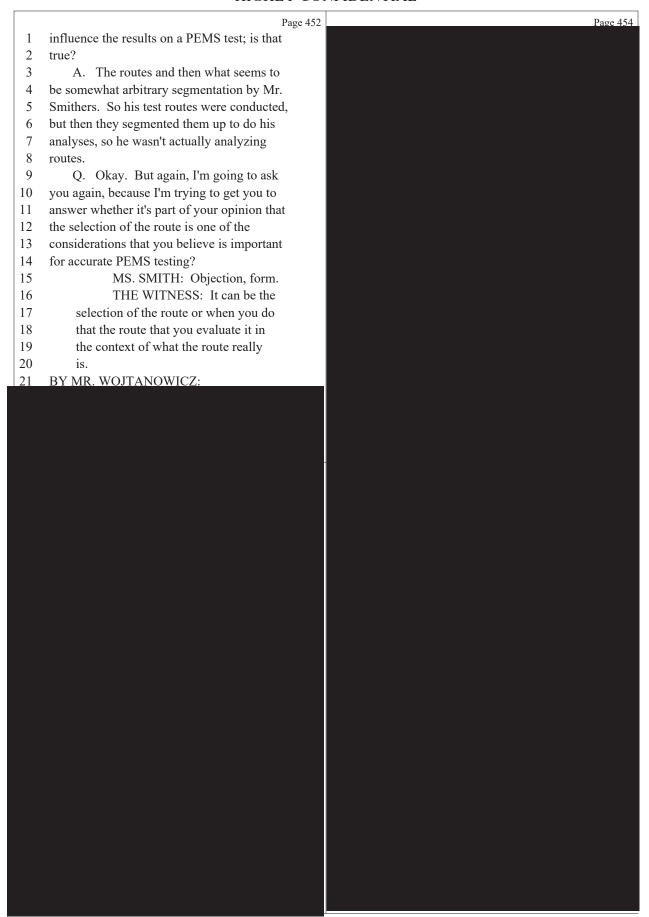


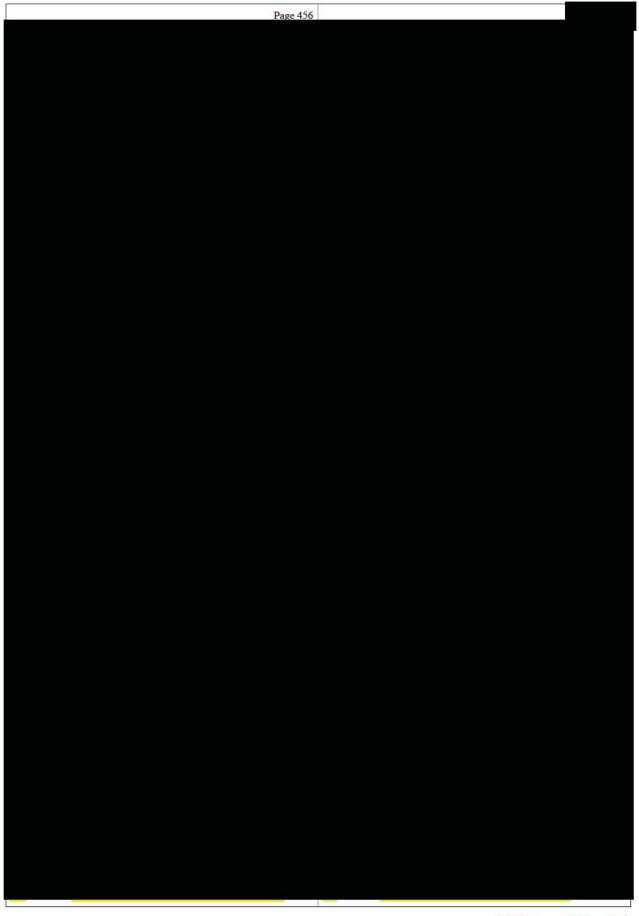




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19
        Q. Okay. Now, one of the things, you
20
    recall that one of the things that you have
21
    indicated that you believe Mr. Smithers did was
22
    to not properly select a test route. Is that
23
    part of your opinion?
24
        A. So his testing and test -- well,
25
    there isn't a single test route. I don't think
                                               Page 451
 1
     he had test routes. I don't know how he
 2
      selected the routes. He drove them and then
 3
     segmented them, but there's not an actual test
 4
     route that he did repeatedly. It's just a
 5
     bunch of testing that he then segmented into
      different segments and analyzed.
 6
 7
          Q. But one of the things that's
 8
     implicit in your criticism of Mr. Smithers is
 9
     that it's important to, you believe that it's
     important to select a proper test route in
10
11
      order to conduct PEMS testing as accurately as
12
     you can. Is that a fair summary of your
13
      opinion?
14
                  MS. SMITH: Objection, form.
15
                  THE WITNESS: So when you
           test something, you need to consider
16
           the different influences that influence
17
18
           the results from that test route or
19
           that segment and consider things like
20
           air conditioning use and hills and
21
           temperature and things like that.
     BY MR. WOJTANOWICZ:
22
23
          Q. And so part of your -- part of your
24
     opinion in this case is that the route selected
25
     is one of those things that influence or could
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34 (Pages 448 - 451)







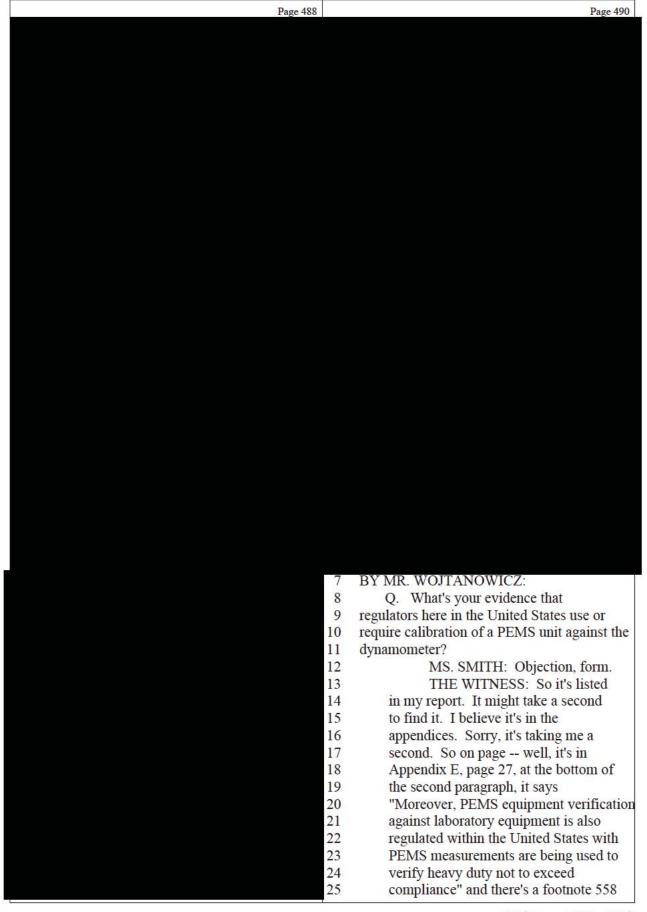








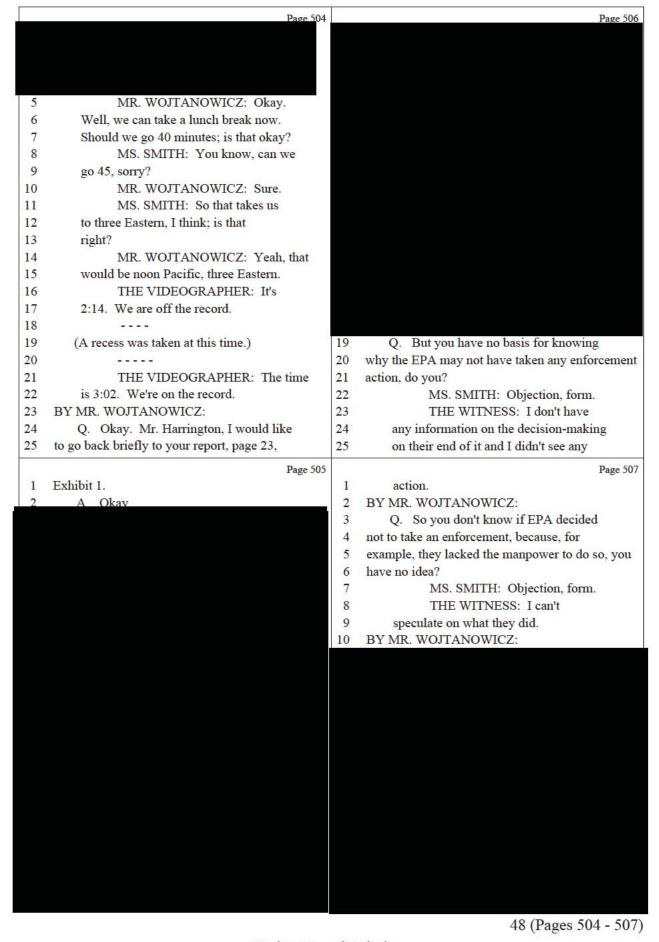




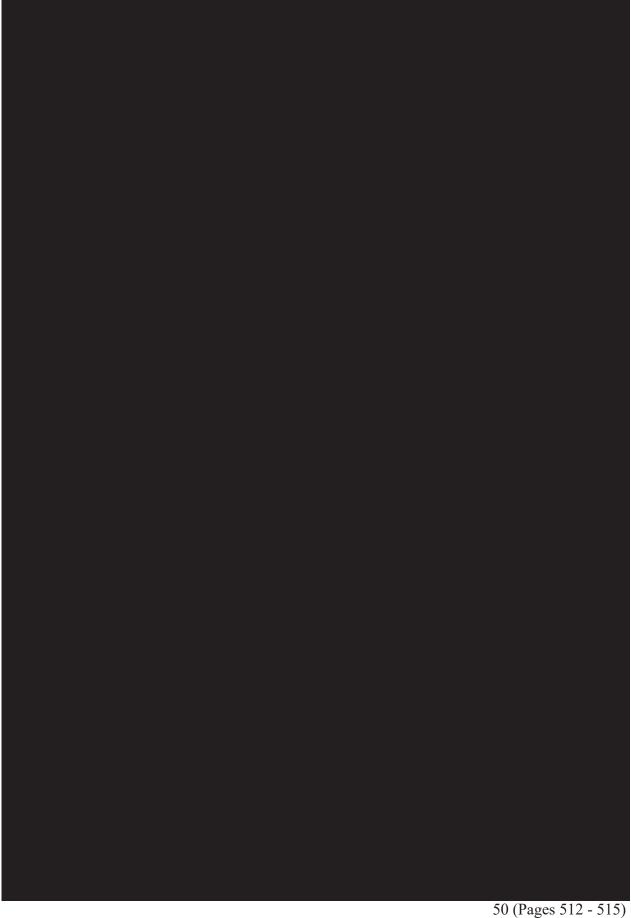
Page 494 Page 492 1 that points to a CFR PEMS calibration 2 and verifications. 3 BY MR. WOJTANOWICZ: 4 Q. Okay. So that was in the context BY MR. WOJTANOWICZ: 4 5 of the heavy-duty truck PEMS testing that's 5 Q. Now, you indicated that there's 6 part of the regulatory structure in the United variability and you discussed that a few times. 6 7 States, correct? 7 In your experience, is the only variability 8 demonstrated by a PEMS equipment compared to 8 A. Correct. That's the only -- the PEMS testing that's regulated in the U.S. dynamometer results in the upward direction? In other words, is it your opinion that the Again, as I stated before, there's no PEMS 10 10 testing for light-duty vehicles. only difference you're likely to get between a 11 11 PEMS result and a dynamometer result is that 12 13 it's going to be worse? 14 MS. SMITH: Objection, form. 15 THE WITNESS: No, go for it. MS. SMITH: Go ahead, sir. 16 17 THE WITNESS: No, it's 18 possible that it could be lower. If 19 you look at the information for the 20 European Commission and EPA, their 21 conformity factors or their adjustment 22 factors are always in the upward 23 direction showing there's more 24 variability with the -- a combination 25 of the PEMS equipment and the on-road Page 495 1 testing. So the way the regulators 2 have looked at it is always in the 3 upward direction, but under certain 4 directions, it's possible that it could 5 show better emissions, but that's not 6 something that the regulators have 7 considered. 8 BY MR. WOJTANOWICZ: 9 Q. Are you aware that the RDE, 10 European RDE standards requires for PEMS testing one continuous trip consisting of 11 urban, rural, and motorway segments? 12 13 MS. SMITH: Objection, form. 14 THE WITNESS: My 15 understanding is that --16 MS. SMITH: Sorry, go ahead. 17 THE WITNESS: That's my 18 understanding. 19 BY MR. WOJTANOWICZ: 20 Q. Okay. And is it your understanding 21 that those segments are determined -- whether you're in a particular segment is determined by 22 23 the speed of the vehicle at any given time? 24 A. I can't remember the specifics of 25 that. I can't remember the segmentation, so.

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HIGHLY CONFIDENTIAL Page 524 Page 526 1 that could have significant impacts on 1 A. Just in any setting? 2 emissions? 2 Q. Yeah, does GM tell people who 3 3 A. I guess it depends on how you run bought these Cruze vehicles that they shouldn't 4 your test and how you set it up. 4 use their air conditioners to avoid polluting 5 5 Q. Okay. the environment? 6 A. I guess, for example, you could 6 A. I've not seen any documentation by 7 test in very, very cold and very hot 7 GM instructing drivers what to do with their 8 8 temperatures that are not consistent with how air conditioning. 9 typical driving is done. You could 10 overemphasize cold and hot testing. 11 Q. Now, if you're trying to determine 12 how a vehicle performs specifically in the 13 realm of specifically when outside temperatures 14 were hot, for example, wouldn't it make sense 15 to actually run more tests in those conditions 16 in order to try and get a complete picture of 17 how the vehicle behaved under those conditions? 18 A. Like I said, it depends on the 19 intent. If you're trying to understand how 20 something operates at a particular temperature, 21 there could be some value in that. So I guess 22 it depends how you then caveat your results. 23 I would also highlight that if 24 you're going to understand the impact of 25 temperature, not documenting how the air Page 525 1 conditioner was used and having no record of 2 that and no information that you've told to

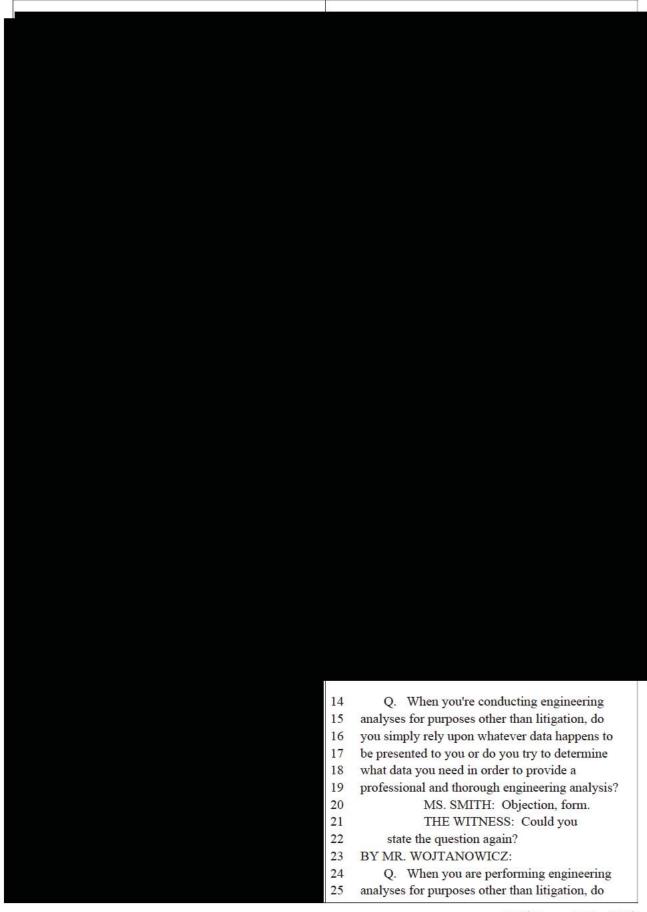
- 3 your drivers, that's a variable that can have 4 an impact on emissions if it is uncontrolled. 5 So in all of the testing that Mr. Smithers has 6 done, I saw no evidence and he stated he
- 7 didn't, he thought that it was with the A/C on, 8 but he wasn't sure, so it's, you know, he may 9 have been trying to understand how the impact 10 of high temperatures, but he had a variable 11 that was uncontrolled and not defined. 12
  - Q. Do you have an understanding that drivers in the real world driving vehicles around when it's warm outside, they tend to turn on their air conditioner, don't they?
- A. I can't speak to what people 16 17 typically do or what everybody would do, but 18 some people might roll the window down, some 19 people might use the air conditioner, which is 20 why the EPA has a specific test for high 21 temperature and air conditioning use, the SCO3.
- 22 Q. Are you aware of any circumstances in which GM has informed people buying the 23 24 Cruze vehicles that they shouldn't use their 25 air conditioners?

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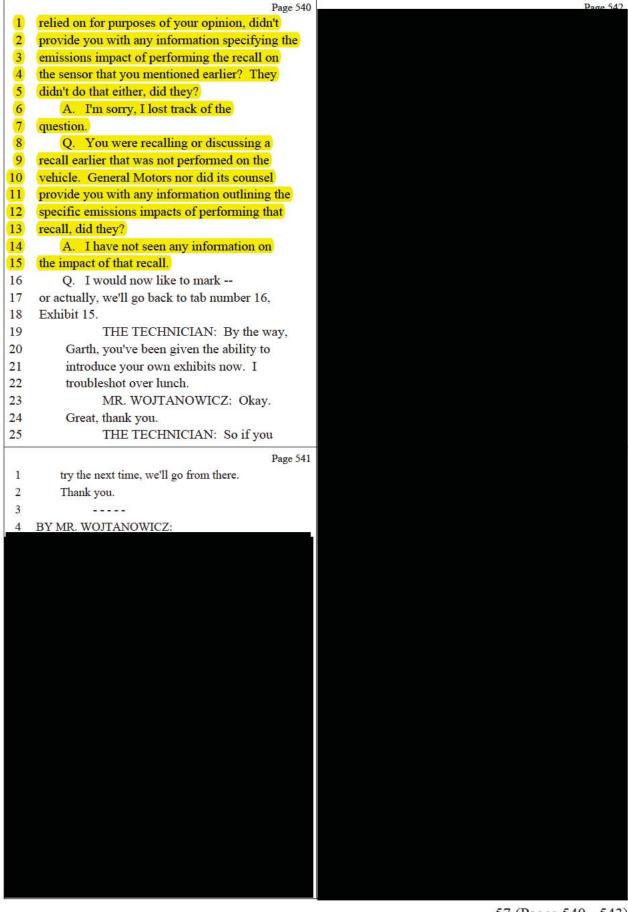
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Page 536 Page 538 1 again, it's hard to make those comparisons. 1 light had something to do with the emissions 2 And you'd have to look really look through it. system, but I don't know if there would have 3 But at the end of the day, there's still issues 3 been any impact, however, having an active 4 with the vehicle, you know, issues that were 4 recall and an emissions system component, 5 observed that could have influenced it, so it 5 you're trying to replicate vehicles that are 6 calls into question the reliability of that 6 on-road that are getting that recall, it seems 7 testing. 7 like it would be good engineering practice to 8 Q. And, again, those supposed issues 8 update the vehicle to have it under the same 9 with the vehicle you identified were at the 9 conditions that the vehicles were in after the vehicle inspection, which occurred a 10 10 recall and on-road. 11 significant amount of time after the actual 11 Q. And there's also a software update 12 PEMS tests were conducted, correct? 12 that was issued during the time that the 13 A. So my understanding is that, you 13 vehicle was being tested, correct? 14 know, the recall was still active starting in 14 A. That's my understanding, yes. 15 2016. There was a dyno test that was done in 15 Q. And, again, had Mr. Smithers between or in the middle of the testing that 16 installed that software update, wouldn't there 16 17 showed results above the certification under 17 have been an issue with tests run before the 18 the standard, the 70 milligrams per mile, so update and after the update no longer being 18 19 something was not normal with the vehicle at 19 comparable or having the tests before not being 20 that point or there was something that was 20 replicable? 21 worth considering that was well prior to the 21 MS. SMITH: Objection, form. 22 inspection. 22 THE WITNESS: You know, I 23 Q. You referred to a recall and you 23 don't know what the impact would be. 24 refer to software updating in your report, but There could be a difference, but not 24 25 you say that they should have updated the 25 understanding that difference, you Page 537 Page 539 software, correct? 1 know, leaves some question about his 1 2 2 A. There was an open recall on the vehicles' representativeness to the 3 upstream NOx sensor, that's correct. 3 other vehicles on the road that have 4 Q. Okay. Now, if some of the testing 4 that recall. 5 had been done prior to the recall, then if they 5 BY MR. WOJTANOWICZ: 6 had actually performed the recall, then the 6 Q. Okay. But you didn't do anything 7 7 testing that they had done prior to the recall to analyze what emissions impact installing or 8 8 not installing that recall had, did you? would not be replicable, would it? 9 9 A. It may not have been replicable. A. No, I did not. 10 One thing that Mr. Smithers could have done was 10 Q. And General Motors, who presumably, retest under similar conditions, we would have you know, on whose behalf you're offering 11 11 12 done a dyno testing at the very beginning which 12 testimony in this case, and who presumably knows the impacts of all of the software and 13 would have been good. He could have checked 13 14 hardware changes it makes to the emissions on 14 that against new testing or he could have rerun 15 some of his routes under similar conditions to 15 its vehicles, they didn't provide you with any 16 information to tell you exactly what the 16 see if there was any difference, but I didn't 17 see any evidence that he did anything to 17 emissions impact would be for installing that 18 understand or try to even understand the 18 software update, did they? 19 difference if he would have applied it. He 19 MS. SMITH: Objection, form. 20 just did not apply the recall. 20 THE WITNESS: I haven't seen 21 Q. Okay. So what did you do to 21 any information on the impact on those understand what the difference would have been 22 vehicles, no. 22 23 BY MR. WOJTANOWICZ: 23 if you had applied the recall? 24 A. I didn't do anything. My 24 Q. And General Motors, whose counsel 25 understanding that the recall mentioned a MIL provided you all of the information that you





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for Mr. Smithers' testing, don't you? 10 MS. SMITH: Objection, form. THE WITNESS: Some of that 11 12 data. Again, there's some missing data 13 about air conditioner use and other 14 aspects, but some of that information 15 about temperature and things like that 16 are present. 17 BY MR. WOJTANOWICZ: 18 Q. Okay. So you could repeat the test 19 routes, because there was GPA [sic] data for 20 Mr. Smithers' tests, correct? 21 MS. SMITH: Objection, form. 22 THE WITNESS: There's GPA 23 data?

BY MR. WOJTANOWICZ:

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1 test results provided by Mr. Smithers that

2 would allow you to replicate every single test

3 run that he did, don't you?

4 MS. SMITH: Objection.

5 THE WITNESS: I don't know

6 what GPA data is.

7 BY MR. WOJTANOWICZ:

Q. You have GPA information in the

Q. I'm sorry, you're right. GPS, I'm
mixing the letters here, it's another, you
know. Sorry, GPS data that would allow you to
replicate the routes that Mr. Smithers
provided?
A. There are certain aspects that we

could replicate. There's, obviously, not all
information was there and it's hard to do
complete repeatability testing with PEMS,
because there's some variability, but there was
GPS information and that -Q. Pardon me. You also have, you have

18 GPS information and that -19 Q. Pardon me. You also have, you have
20 information that allows you to know what the
21 temperature was, what the speed of the vehicle
22 was, and you've got the GPS data also allows
23 you to assess the elevation of the vehicle at
24 any given time, correct?
25 A. You know, again, there was

1 potential issues with the temperature probe 2 measurement that I mentioned that there was 3 some anomalies, so there would be some 4 uncertainty there and uncertainty about the 5 weight or exactly how the driver was driving, 6 but there would be some information from the 7 GPS vehicle speed and other things to allow 8 some form of repeatability, but there's, 9 obviously, vehicle condition and other things 10 would make it difficult to replicate completely Mr. Smithers' data or Mr. Smithers' testing.

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7 Q. Mr. Smithers did provide 8 maintenance records and inspection records for 9 when the vehicle was purchased and as I said, 10 the DTC information is included in the testing 11 data, isn't that relevant to the state of 12 health of the vehicle? 13 MS. SMITH: Objection, form. 14 And foundation. 15 THE WITNESS: Again, the 16 DTCs, that data was not listed. It was 17 listed for the gasoline vehicles, but 18 interestingly enough, it wasn't listed 19 for the diesel vehicle. It's not clear 20 why it was recorded for one vehicle but 21 not the other. And there were some 22 maintenance records, but as has been 23 evidenced throughout this, there was 24 not all the records. There was -- his 25 report didn't mention the NOx sensor

60 (Pages 552 - 555)

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